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**FY 2014 BPA IT Asset Strategy Plan**

# **BPA IT Asset Strategy**

## **Office of the Chief Technical Officer**

**January, 2014**

*This asset strategy was prepared before BPA's proposal to reduce costs. Spending levels in this document may not tie to proposed reductions. The strategy will be revised upon conclusion of the CIR and the IPR.*



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**FY 2014 BPA IT Asset Strategy Plan****1.0 Executive Summary - IT Asset Management Strategy****1.1 Profile of Assets**

The Information Technology Asset Strategy covers the technology assets hosted in the Bonneville User Domain (BUD). These assets comprise,

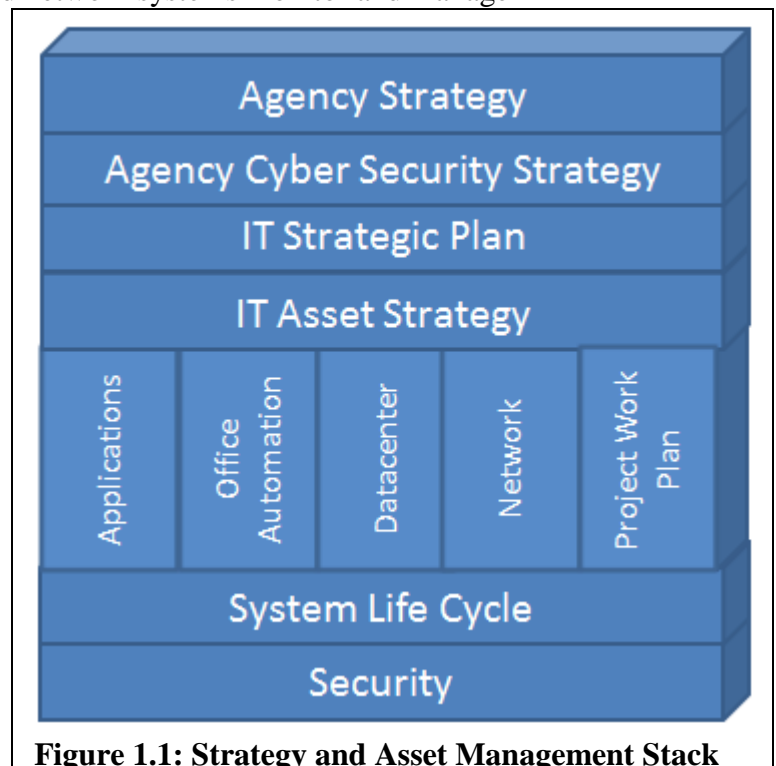
- 1% of the BPA's Plant In Service total capital assets
- 4% of the BPA's planned FY2014 capital spend
- 2% of the BPA's Departments planned FY2014 expense spend

These assets include circuits, servers, storage devices, desktop systems, printers, copiers, faxes, phone systems, and software, including Software as a Service (SaaS). The software systems covered by this strategy include critical business systems, general business systems, web applications, and task systems. Critical business systems must operate and be available around the clock (24x7). There are approximately 20 critical business systems. These systems enable power and transmission marketing and scheduling functions, hydro operations, and load forecasting. General business systems enable BPA to manage its staff, finances, facilities, supply chain, transmission assets, and services such as managing circuits and work planning. Task systems are small web based applications that enable BPA staff to more efficiently perform their work. A small sampling of examples include: Absentee Tracking System, the Tribal Matrix website, and the NW Sub-basin Geographic Data browser.

This strategy does not cover technology assets residing on the operational grid network, as they are not currently under IT governance. Grid network systems monitor and manage the status of the electric grid. These management systems include our SCADA (supervisory control and data acquisition) and AGC (Automatic Generation Control) systems.

The IT Asset Portfolio is divided into four major asset portfolios and the Project Work Plan as shown in Figure 1.1. The Project Work Plan contains the projects, which create assets (software system, networks, datacenter, etc.) that are placed into production under one of the four asset portfolios. Each asset portfolio has its own asset plan. We use these individual asset plans to create our overall IT Asset Strategy.

The Office Automation, Network, and Datacenter Portfolios collectively form the information technology infrastructure that supports both users and systems. We will use infrastructure throughout this strategy to refer collectively to these three portfolios.



**Figure 1.1: Strategy and Asset Management Stack**



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Assets	Office Automation	Data Center	Network
	Desktops, laptops, printers, and desktop software	Servers (infrastructure servers, application servers, database, etc.) operating systems, database management systems, and management tools	Data, voice, and video networks
Asset Category Activities	<ul style="list-style-type: none"> <li>Refresh of network printers and desktops/laptops</li> <li>Upgrading workstation software</li> <li>Adoption of new technologies</li> <li>Bringing or maintaining systems in compliance with architectural standards</li> </ul>	<ul style="list-style-type: none"> <li>Refresh of servers and storage</li> <li>Migrating to new server operating systems</li> <li>Adopting new technologies (hierarchical storage management, virtualization, etc.)</li> <li>Enhancement of data center (improving bandwidth between servers and SAN, improving backup and recovery, server consolidation, etc.)</li> <li>Bringing or maintaining systems in compliance with architectural standards</li> </ul>	<ul style="list-style-type: none"> <li>Refresh of network infrastructure (routers, switches, hubs, firewalls, cabling, etc.)</li> <li>Enhancement of network infrastructure (remote access, wireless access, etc.).</li> <li>Adoption of new technologies (tele-presence, messaging convergence, IPV6, etc.)</li> <li>Bringing or maintaining systems in compliance with architectural standards</li> </ul>

**Table 1.1: Infrastructure Portfolios**

**Application Portfolio** – Includes the sub-portfolios for Critical Business Systems, Business Systems, General Purpose Systems, and General Task Systems. New systems are added through projects. All projects are reviewed by the Agency Prioritization Steering Committee (APSC); projects with total investments under \$3M are selected and prioritized by the APSC based on relative business value. Those projects with investments greater than \$3M are forwarded to the Agency’s capital prioritization process to compete for funding. The Application Portfolio covers:

- Implementing minor or major software upgrades
- Managing systems implemented as Software as a Service (SaaS)
- Applying system or security patches
- Implementing planned new features to meet business needs
- Addressing user requested changes to meet emerging business needs
- Correcting bugs or erroneous computing conditions
- Implementing annual changes such as tax code changes
- Implementing expense Projects for major system changes
- Implementing potential Capital Projects for delivering new functionality
- Maintaining systems in compliance with the enterprise architecture
- Retirement and/or disposition of systems

**1.1.1 Critical Assets**

Critical IT assets are defined by the functions they support and/or their availability requirements<sup>1</sup>. A critical system supports one or more of the following functions:

- Real time or preschedule transmission or power scheduling
- Hydro operations

<sup>1</sup> [Criteria for Determining Critical Business System Designation](#); 5 April 2010, Official File – NJ-6 (IR-11-12)



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- Marketing (deal capture, day ahead trading)
- Short term forecasting, planning and loads

The critical IT services include network, email, telephone, and DNS services. A critical IT service has a 24x7-availability requirement and supports the above functions on an hourly basis. Using these criteria for critical business services, there are 20 critical business systems and 4 critical IT services. For a listing of the 20 critical business systems, see chapter 6, Application Portfolio.

The critical business systems are contained in the Application Portfolio's Critical Business Systems sub-Portfolio. The Network Portfolio contains the network, telephone, and DNS services. Email is in the Application Portfolio's General Business sub-portfolio.

**1.2 Objectives of this Strategy**

The goal of the Agency's Asset Strategy is to maximize the long-term operational and economic value of our assets. This goal is accomplished by ensuring assets operate efficiently and effectively and provide the capacity and capabilities needed to meet health and safety, reliability, availability, adequacy, environmental, security and other standards, striving to minimize total economic costs over the long-term. The Information Technology Asset Strategy has developed four goals covering IT assets that align with the Agency asset strategy and span the four IT asset plans.

**1.2.1 Information Technology Asset Goals**

1. Enable BPA to reliably and securely, in accordance with Federal and Industry regulations and laws, use IT resources to effectively and efficiently perform work while maximizing utilization of IT resources. (ITAG 1)
2. Optimize total cost of ownership by balancing the costs of new investments for upgrades and replacements with ongoing operations and maintenance costs. (ITAG 2)
3. Strike a balance between each individual business unit's immediate requirements and overall BPA strategic objectives by delivering flexible and extensible assets that meet current objectives and can be leveraged to meet future strategic business objectives, resulting in reduced future delivery times and least total cost of ownership. (ITAG 3)
4. Institutionalize Operational Excellence through the adoption of maturity models to drive continuous improvement processes, practices, and service delivery to maximize the value of our IT assets and to reduce the cost of operations and maintenance. (ITAG 4)

These goals are mapped in each of the IT sub-portfolio category chapters, to the sub-portfolio strategies.

**1.2.2 Asset Sustain Rates**

Infrastructure assets are refreshed based on a combination of industry best practices and BPA's desire to optimize value in its investment. As a rule, BPA maintains hardware one to two years beyond industry best practices. Although this approach does increase the risk of failure in the latter year of operations, historically this has not had an adverse impact on BPA's environment. Critical systems are redundant by design, reducing the risk of operational disruptions. The increases in replacement costs from hardware failure in the year leading up to a refresh cycle are offset by lower operating costs provided by maintaining environmental stability, allowing



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BPA to optimize the value of its investments, and keeping the overall total cost of ownership lower than adhering strictly to industry recommendations. Table 2.2 shows the refresh rates for BPA's major infrastructure assets. We discuss our refresh rates and strategy in detail in section 2.4.

There is not a standardized refresh schedule for IT application systems. We maintain IT applications while the systems continue to meet business needs and are cost effective. Upgrades and replacements are considered discretionary and are either expense or capital projects. Delivering and supporting automated business systems accounts for approximately 40%<sup>2</sup> the annual IT capital budget and 40% of the IT expense budget. New automated business systems result in new support contracts, new operations & maintenance costs, and on-going enhancement costs.

**1.3 Strategic Challenges**

IT at BPA faces a number of challenges, which can be grouped into the following bins: compliance, Rate of Change in IT, and Strategic Partnership:

<u>Compliance</u>	<u>Rate of Change in IT</u>	<u>Strategic Partnership</u>
<ul style="list-style-type: none"> <li>• Increasing NERC-CIP Regulation</li> <li>• Rising bar for Security               <ul style="list-style-type: none"> <li>○ Implementing SCOAC</li> <li>○ Implementing SANS Top 20</li> <li>○ Evolving threats – especially awareness to grid operations</li> </ul> </li> <li>• Federal Guidance               <ul style="list-style-type: none"> <li>○ Implementing ICAM/HSPD-12</li> <li>○ Implementing IPv6</li> <li>○ Transitioning to Trusted Internet Connections (TIC)</li> </ul> </li> <li>• COOP and Disaster Recovery</li> </ul>	<ul style="list-style-type: none"> <li>• Rate of change in IT, changing roles/skills</li> <li>• Rise of Cloud based solutions</li> <li>• Hardware core sustain transitioning from capital to expense</li> <li>• Transitioning to workload-based storage</li> <li>• Consumerization of IT (managing smart phones, tablets, and other consumer products)</li> </ul>	<ul style="list-style-type: none"> <li>• Aligning IT and business objectives</li> <li>• Developing strategies to address aging applications/business systems</li> <li>• Adoption of Software as a Service (SaaS) solutions</li> <li>• Evolving use of capital and expense to provision solutions (new assets)</li> <li>• Prioritizing development and deployment of new assets (business solutions) based on Agency value</li> <li>• Establishing business boards to prioritize enhancements</li> </ul>

We discuss these challenges in detail in the overview and the chapters covering each asset category. However, it is important to note that two areas, hardware core sustain and SaaS, will prove to be challenges in out-year budgeting for capital and expense. Hardware costs have been dropping with many items (such as servers, individual blades, and most network switches) approaching or falling below the threshold for capitalization, putting additional pressure on expense budgets. The details of drivers and impact on capital and expense programs are discussed in each of the infrastructure chapters. In a different vein, it is not always known in advance whether SaaS will provide the optimum business solution for a given project when programming out-year capital and expense requirements. Since SaaS solutions cannot be capitalized (no tangible BPA owned asset) we may have programmed capital when the project may instead need expense funding. These challenges could introduce up to a 10% uncertainty level in capital and expense requirements in a given year. This uncertainty is not in the combined yearly budget requirement (capital and expense), rather in if we have over or

<sup>2</sup> With the completion of major infrastructure projects in FY2014/FY2015, we expect capital requirements to drop substantially with business systems accounting for 75% or more of capital expenditures





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under programmed for capital or conversely expense. We will need to identify strategies that will allow us to handle this yearly uncertainty in capital versus expense requirements.

**1.4 Major Elements of this Strategy**

We are shifting the emphasis of our asset strategy from being heavily tilted toward achieving efficiencies to the combination of becoming a more effective strategic business partner and leveraging technology to achieve both business efficiencies and cost efficiencies. We have been able to contain expense expenditures well below the rate of inflation and the cost of new contracts<sup>3</sup> from FY2005 to FY2013. This came at the cost of delaying improvements and innovations, with some criticism that IT was not the effective strategic partner the Agency needed – a partner whose fundamental purpose is to provide and maintain automated business solutions. In FY2011, we began to change our focus to strengthen leveraging technology to drive efficiencies. Table 2.1 provides a listing of top industry IT innovation trends and our alignment with these trends. From this table we see that we either strongly align or align with 13 of the 16 major industry initiatives. By leveraging these trends, we are projecting to control our growth through FY2017<sup>4</sup> (leveraging technology will help us control our operations cost as we explain in detail in the chapters covering our infrastructure assets). However, these innovations are primarily on the infrastructure side of our assets. An area we need to develop is leveraging and delivering a greater degree of innovation to our business clients.

We are now working to become a more effective strategic partner, which entails working with the various business units to understand their future needs, transitioning from a reactive order taker to proactively shaping the Agency's future business automation environment.

Each of these IT Portfolios has its own unique challenges, risks, constraints, and need for methodological improvements. We discuss these issues in detail in the chapters covering each portfolio. Here we provide a brief discussion of the risks collectively facing all of IT's assets. High-level risks are discussed in Chapter 2 and presented in Table 2.3<sup>5</sup>.

Since the release of the previous strategy in 2012, three high level risks (R1, R5, and R6<sup>6</sup> from the FY2012 Asset Strategy) have been either mitigated to acceptable levels or are no longer risks. New risks have been identified and documented in Table 2.3. R8 addresses changing regulatory requirements associated with proactively protecting the IT environment from the challenges of emerging and evolving security threats. R3-R4 refer to a combination of pressures IT faces that include the need to link the operations and enhancement costs of

<sup>3</sup> Figure 2.1 shows that from FY2005-FY2012, actual IT expense expenditures fell below rate of inflation and new contracts, resulting in a net savings of \$42M during this period, as reported in the FY2012 IT Asset Strategy.

<sup>4</sup> Longer term projection are problematic due to uncertainty in system software costs and the degree and speed we adopt cloud based solutions which require expense to implement and then annual service fees.

<sup>5</sup> Note: We are using the Agency's standardized impact scale in order for the IT risks to be comparable to other Agency Asset risks; however, given that IT's expense and capital programs are each less than 4% of the Agency's programs respectively, even a Minor category impact (impact \$100K-1\$M) can have a large impact on an individual IT Asset Category.

<sup>6</sup> R5 and R6 speak to completing our key project of datacenter and desktop virtualization. R1 speaks to the difficulty in realigning capital and expense in a given operating year.





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automated business assets with the value they provide to the business. Today, there is a disconnect in the sense that business units are realizing the benefits without a direct connection to the ongoing IT cost of supporting these systems. A more detailed discussion of these challenges is presented in Chapter 2.

**1.4.1 COOP and Disaster Recovery**

Critical assets (see section 1.1.1) must meet Continuous Operations (COOP) requirements. Our non-critical business assets also have return to operation requirements after a major event, commonly referred to as Disaster Recovery (DR), which range from hours to up to a month. Each of the four major asset portfolios contains availability improvement initiatives that can be and are being weaved into a combined strategy to achieve and meet both COOP and DR business requirements. Many of the assets currently in, or planned to be delivered, into the four major asset portfolio are contributing to the Agency's overall COOP and DR capabilities. Examples include providing voice over IP services to the Munro Scheduling Center, providing virtual desktop recovery capabilities at our Alternate Data Center (ADC), and leveraging myPC to provide remote access to network services during major events. Our System Life Cycle (SLC) requires new projects to identify and address COOP and/or DR requirements to ensure we are delivering assets that meet business availability and recovery requirements. To bridge the gap between our current business systems' disaster recovery capabilities and future capabilities baked into the SLC, we will be undertaking a Business Systems Disaster Recovery (BSDR) project in the FY2015-FY2017 timeframe to deliver DR unified and comprehensive capabilities for our legacy systems.

**1.5 Results to be Achieved**

We are in the preliminary steps of implementing a dual strategy of leveraging technology to achieve efficiencies and becoming a proactive strategic partner to the business lines. Major infrastructure milestones we expect to hit in FY2014 and FY2015 include completing the migration to our virtual desktop infrastructure (myPC project) and migration of our general business systems to a consolidated and virtualized datacenter (IVC project). In addition to aiding in the control of Office Automation costs, we will be able to leverage myPC to expand our telework capabilities<sup>7</sup>. Our myPC environment will enable staff to use their own mobile devices to access network resources - enabling Bring Your Own Device (BYOD). The myPC project will also move us to a more current desktop operating system (Windows 7), current office suite, and more recent browser (see the chapter on Office Automation for more details). The IVC project will move us to more current operating systems and database versions on consolidated and virtualized servers. Both myPC and IVC are intended to leverage innovation to deliver an agile and elastic environment, with lower overall operational costs.

We have begun to strengthen the partnership between business lines and IT to help develop longer-term strategies and roadmaps for our business systems. The Business Enterprise Services Strategy team is developing a strategy and roadmap for our major Human Capital, Finance, Contracts, Billing, Transmission Asset Maintenance, Project Planning, and Supply Chain systems (see chapter on Application Portfolio for details). The roadmap is expected to be completed by first quarter in FY2015 and will address when to replace or refresh major

<sup>7</sup> myPC can also be leveraged to ensure desktop services and access to network resources during COOP or disaster recovery events



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systems. For example, the roadmap will address when to replace our billing system (system will be out of support in FY2020) and future direction for our ERP (Enterprise Resource Planning) system which is approaching 15 years in service. Table 1.3 highlights major initiatives we are planning over the upcoming years and will be updated as we complete our business strategies. In addition to identifying refresh and replacement dates, the strategy will also examine how to leverage and use unused or underused capabilities in our existing enterprise systems prior to implementing new systems.

Since FY2010, the Work Plan portfolio's capital has been averaging about \$40M annually with approximately 40% of the capital program being used to modernize and expand our infrastructure capabilities (see Chapter 7 for details). The majority of our program is used to deliver new business capabilities or to improve business capabilities. Figure 7.1 shows the delivery of new systems based on our capital program and Figure 7.2 shows the actual and expected benefits from these new systems.

Our major infrastructure modernization projects are expected to be completed in FY2015 (although we will start smaller modernization projects like strengthening our Backup Services). With the completion of the major components of infrastructure modernization, coupled with applying IT capitalization rules, we expect to see a shift from a need for capital to expense to maintain our infrastructure in the out years. However, we are facing uncertainty in whether capital or expense will be required for hardware refreshes (see chapters 4 and 5 for details on these uncertainties). At the same time, we will need to either upgrade or replace several key and large systems. A summary of major initiatives and associated costs are presented in Tables 1.3 through 1.5.

IT is working to establish and implement Asset Plans for each IT asset category to support the IT Asset Strategy. Our commitment to the continued maturing and use of Asset Plans can be seen in the integration and use of Asset Plans to drive our planned work for system enhancements.

To support our Asset Plans, and the management of our assets, we are in the beginning stages of rolling out metrics that will inform us of the state of our assets as well as their level of performance, both in terms of meeting customers' needs and economic targets. A major component of our metric plan includes our participation in UNITE. UNITE is a consortium of twenty utilities from across the nation engaged in benchmarking the performance of IT operations and practices with the intent of aiding members in understanding their performance against their peers and to identify areas that can be improved.

We completed our initial benchmarking cycle with UNITE in early 2012 utilizing FY2011 data. We intend to leverage our benchmarking work with UNITE to formalize our metric collection program and in doing so incorporate key UNITE metrics and methodologies. We used this past cycle to establish FY2011 as a baseline for several key metrics. This adoption of UNITE metrics and methodology is reflected in changes we are making in our IT Asset Strategy Performance Indicators. This is the ideal time to make these changes as we are in the initial stage of implementing these metrics. We are beginning another benchmarking year with UNITE, starting 2<sup>nd</sup> Quarter FY2014, and will start to collect and report metrics to UNITE.



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We expect to see results from the consortium members for FY2013 by the end of the 3<sup>rd</sup> Quarter FY2014.

**1.5.1 Summary of IT Performance Indicators (ITPI)**

This is J's second reporting period after establishing baselines for our indicators. Although the status of each indicator is informative, the true value for J comes in the analysis of the trend of these indicators over time. The trend will allow us to determine how our strategies toward our assets are or are not meeting our objectives and will provide us insight into where we need to concentrate our resources or rethink our strategy.

These performance indicators show that in the second reporting period our strategies to contain operations and maintenance costs below inflation (and new contract costs from moving new systems into production) are working, as shown by ITPI-1, ITPI-3, ITPI -10. However, ITPI-7 slipped to red due to project delay in implementation of IVC – our project to consolidate and virtualize our non-critical business systems. We will not realize all our expected cost efficiencies for Data Center Maintenance and Operations until we complete our system migration as part of IVC. We do have some voice network components - private branch exchanges (PBX) and the voicemail system - that are beyond their end of life which is driving ITPI-5 to red for this reporting period. The voicemail system is scheduled to be replaced in the second quarter of FY2014 by leveraging Exchange 2010. The PBXs are scheduled to be replaced as part of the network modernization in FY2015-FY2016. This indicator will remain red until the PBXs are replaced. Software utilization collection was suspended during the roll-out of myPC (our virtual desktop infrastructure), in light of not having the appropriate tools and available staff (staff resources are focused on deploying thin clients and refreshing laptops and desktops) to collect and report on this measure. It will continue to report red until myPC is fully deployed by FY2014 Q2.

Indicator		FY2012 Status	FY2013 Status
ITPI-1	Average Personal Computing Device Cost	GREEN	GREEN
ITPI-2	Software Utilization	GREEN	RED
ITPI-3	Enterprise Printing Costs	GREEN	GREEN
ITPI-4	Network Utilization	GREEN	GREEN
ITPI-5	Network & Voice Operations and Maintenance Status	RED	RED
ITPI-6	Physical Windows Server Consolidation	GREEN	GREEN
ITPI-7	Data Center Maintenance Operations and Maintenance Growth	GREEN	RED
ITPI-8	Server Operating System Configuration Monitoring	GREEN	RED
ITPI-9	Ability to Enhance Systems	GREEN	GREEN
ITPI-10	Operations and Maintenance Growth	GREEN	GREEN

Table 1.2: Summary Performance Indicator



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We have reshaped our expense and capital budgets to accommodate infrastructure refreshes with the anticipated shift in the use of expense for infrastructure sustain projects, and system upgrades. We are also anticipating more Software as a Service solutions in the out-years which will require expense instead of capital funding.

When compared to the 2012 spending profile, the combined capital and expense FY2014-FY2023 funding profile is lower and includes a drop in the capital profile and a rise in the expense budget. The current funding profile for FY2014-FY2017 is \$38.6M lower than the funding profile proposed in the 2012 planning cycle (Table 1.3). The capital profile also reflects that IT projects with total investments greater than \$3M will need to compete at the agency level beginning in FY2015 and all non-sustain IT projects will need to complete at the Agency level beginning in FY2018.

Given the rapid rate of change in IT, coupled with emerging business and compliance requirements, there is uncertainty associated with the proposed funding profile. These uncertainties are discussed in detail in the Overview chapter and each of the asset portfolio chapters. As a result of these uncertainties, we are presenting a target, a high, and a low funding profile in Table 1.4. Figure 1.2 displays the funding profiles. A high level summary of these include:

**High Capital Profile scenario:**

- Materials and contract labor costs escalate at a significantly higher rate than inflation rate forecast
- Equipment failure rates escalate such that replacements must be accelerated
- Requirements to meet regulatory compliance may materialize sooner than expected
- Resources required to complete planned initiatives may be significantly underestimated due to immature data

**Low Capital Profile Scenario:**

- Adoption of larger number of subscription-based solutions (SaaS) than planned will require increase in expense requirements and corresponding reduction in capital requirements
- Cost of hardware items (e.g. servers) are approaching capitalization threshold and may fall below threshold requiring expense instead of programmed capital funding

	<b>FY2014</b>	<b>FY2015</b>	<b>FY2016</b>	<b>FY2017</b>	<b>FY2018</b>	<b>FY2019</b>	<b>FY2020</b>	<b>FY2021</b>
Expense	79.0	83.2	85.0	86.6	88.3	84.0	84.0	84.0
Capital	43.0	42.0	43.0	44.0	45.1	45.3	45.3	45.3
Total	122.0	125.2	128.0	130.6	131.7	127.6	129.3	129.3

**Table 1.3: 2012 Planning Cycle IT Asset Capital and Expense Projections (\$M)**

	<b>FY2014</b>	<b>FY2015</b>	<b>FY2016</b>	<b>FY2017</b>	<b>FY2018</b>	<b>FY2019</b>	<b>FY2020</b>	<b>FY2021</b>	<b>FY2022</b>	<b>FY2023</b>
<b>Target Funding Profile</b>										
Expense	79.0	85.8	87.3	87.6	89.4	91.6	92.5	93.9	97.3	99.3
Capital	43.0	31.2	32.8	25.4	10.0	5.0	2.5	12.0	4.7	6.5
Combined	122.0	117.0	120.1	113.0	99.5	96.5	95.0	105.9	102.0	105.8

**Table 1.4 2014 Planning Cycle IT Asset Capital and Expense Projections (\$M)**

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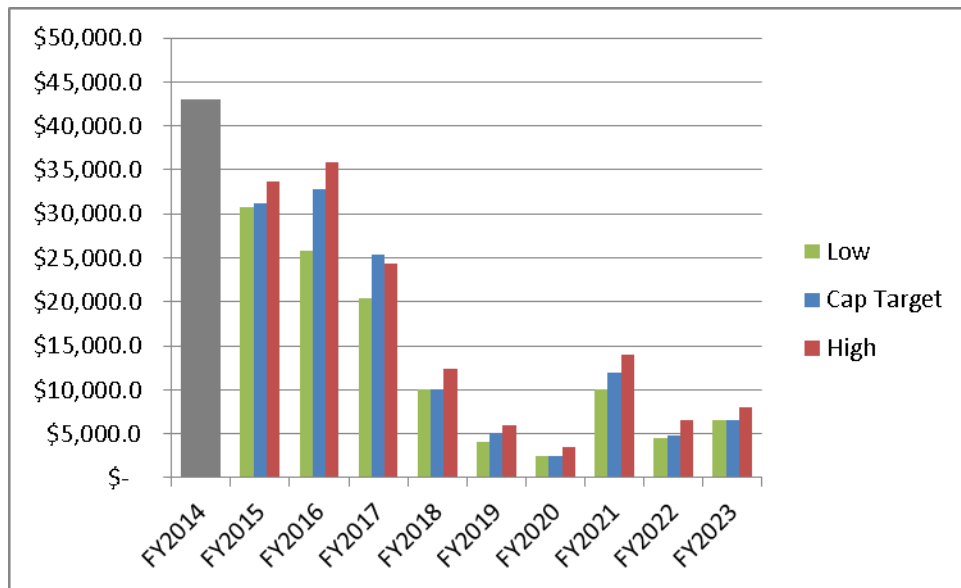
**FY 2014 BPA IT Asset Strategy Plan****Figure 1.2: Combined Capital and Expense Funding Profile**

Table 1.3 depicts a summary of the major initiatives driving our funding profile. Each asset category has a similar table showing in detail the initiatives for that category. Given the planning horizon, coupled with the rapid pace of technology change in IT, there is uncertainty in the timing and speed of execution of these initiatives. This uncertainty may manifest in shifts in spending between years, shifts between capital and expense requirements, and funding levels as shown in Figure 1.2.



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Portfolio	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Office Automation	Complete Fleet Refresh	Tablet Expansion	Tablet Expansion	Tablet Expansion	Tablet Expansion	Thick Client Fleet Refresh	Tablet Refresh	Tablet Refresh
	Introduce Tablets							
	Deploy Mobile Device Manager			Tablet Refresh	Tablet Refresh			
	Transition to Managed Print Services				Rugged Laptop Refresh			Refresh General Business Datacenter
Datacenter	IVC Refresh	Complete IVC	Storage Refresh	Storage Refresh		Exadata Refresh	Refresh Critical Business Datacenter	
			Introduce Flash Memory	Move email to Cloud				
		CBS Refresh	Transition Development to Cloud	Transition Development to Cloud	Storage Refresh	Storage Refresh	Storage Refresh	Storage Refresh
		DMZ Refresh and/or Cloud	Storage Growth	Storage Growth	Storage Growth	Storage Growth	Storage Growth	Storage Growth
		Analyze Backup Services	Refresh Backup Services					
Network	Refresh cabling in Dittmar	Refresh Cabling in Ross & Van Mall	Fresh & upgrade Firewalls				Refresh field devices	-Refresh core (LAN/WAN) devices
			Refresh and upgrade IDS					Refresh and upgrade Firewalls
	Implement 2 Factor login HSPD-12	Plan Upgrade Network & move to IPv6	Upgrade Network & to IPv6					
	Adopt TIC Circuits	VoIP Softphones						
	MSC Phones							
Application		Sunflower Upgrade	Enterprise Application Study (ERP)	Implement Enterprise Solution	Implement Enterprise Solution	Transition Enterprise Solution	Sunflower Upgrade	
			Asset Suite Upgrade	Asset Suite Upgrade				
			Replace Customer Billing System	Replace Customer Billing System				
Work Plan	ICAM	ICAM	ICAM					
	ALF Upgrade	BICC	BICC	BICC				
	Portfolio Management	Portfolio Management						
	ATC State Awareness	Structured Data Management	Structured Data Management	Structured Data Management				
	AMS Cal & Reporting	EE Central Replacement	IT Service Management	IT Service Management				
	Real Time Load Monitoring	Powerflow Info Storage & Balancing Tool	Real Time Power Management	Real Time Power Management				
	EE Tracker	TAS Lines	TAPM	TAPM				
	Electric Quarterly reporting	Streamflow Model Replacement	Power Constraint Management	Power Constraint Management				
	Budget Forecasting	Business System DR	Business System DR	Business System DR				

**Table 1.5: Major Initiatives (blue sustain, red compliance, green expand)**

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**FY 2014 BPA IT Asset Strategy Plan****1.7 Future Asset Strategy Enhancements**

We will continue to evolve and mature our asset strategy. As part of this evolution, there are several areas that we have just begun to work on. However, we have not developed these areas sufficiently to include them in our current Asset Strategy. We expect the following areas to be developed and included in our FY2016 Asset Strategy.

- Treating Information as an Asset, as an asset category: The volume and velocity of our data growth is exposing problems with data quality, maintaining data, improving accessibility, and the cost of storing and managing data. At the same time, our business processes are becoming increasingly data driven. This convergence of drivers is causing us to rethink our approach toward data and to consider treating information as an Agency asset in order to ensure reliability, security, availability, quality/consistency, and to control costs associated with Agency information to include both structured and unstructured data.
  - Improving data quality through data governance
  - Creating a BPA Common Information Model (CIM) through adopting and extending industry standards based information models such as the IEC Common Information Model for Transmission services
  - Using CIM to reduce integration costs and facilitate our Service Oriented Architecture (SOA)
  - Facilitating the rollout of self service Business Intelligence (BI) and data analytics
  - Supporting Information Governance and Lifecycle Management (IGLM) – aligning with federal regulations on eDiscovery, protecting Personally Identifiable Information (PII), and records management
- Maturing our Enterprise Architecture Practices: Enterprise Architecture practices will become increasingly important in ensuring we apply our resources to meet Agency objectives. This will lead to maximizing our investments in our current assets and delivering cost effective solutions, with the potential to deliver future solutions. This initiative will primarily impact the PMO Work Plan and the Application Portfolio.
  - Maximizing our investments in our assets by ensuring we leverage existing capabilities (or extend them) prior to buying new systems
  - Rationalizing our system/application portfolio - minimizing redundant capabilities
  - Ensuring the capital project portfolio is spanning and addressing Agency initiatives/goals and risks
- Workforce Transformation: The role of IT is evolving while at the same time our workforce is aging (the median IT worker age at BPA is 52 years) with an expectation of up to 33% of the current federal workforce retiring in the next 5 years. To ensure a stable workforce with the right skills to maintain our assets, we will need to ensure our IT Asset Strategy and Workforce Strategy stay aligned. We will also need to ensure

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our solutions align with younger workforce expectations for business automation capabilities. This transformation will cut across all portfolios.

- Shift from Builders to Integrators
  - Shift from on premise solutions to cloud based solutions
  - Buy first, build or customize second
  - Orchestrate the services to meet the business needs (put it in the cloud)
- Ensure technical solutions (assets) remain aligned with workforce expectations
- Service Transformation: IT will need to evolve and adapt to create and manage a more flexible automation environment. This transformation ranges from a shift from traditional on premise solutions to cloud based solutions to giving end users greater control to self-select and implement solutions from a menu of options. This transformation cuts across Office Automation, Datacenter and the Application Portfolios and will encompass:
  - Enabling self service
    - Application Store
    - Menu of standardized device form factors (e.g. smartphones, tablets, laptops, workstations, etc.)
  - Adopting cloud based solutions (from IaaS to SaaS)
  - Enabling BYOD



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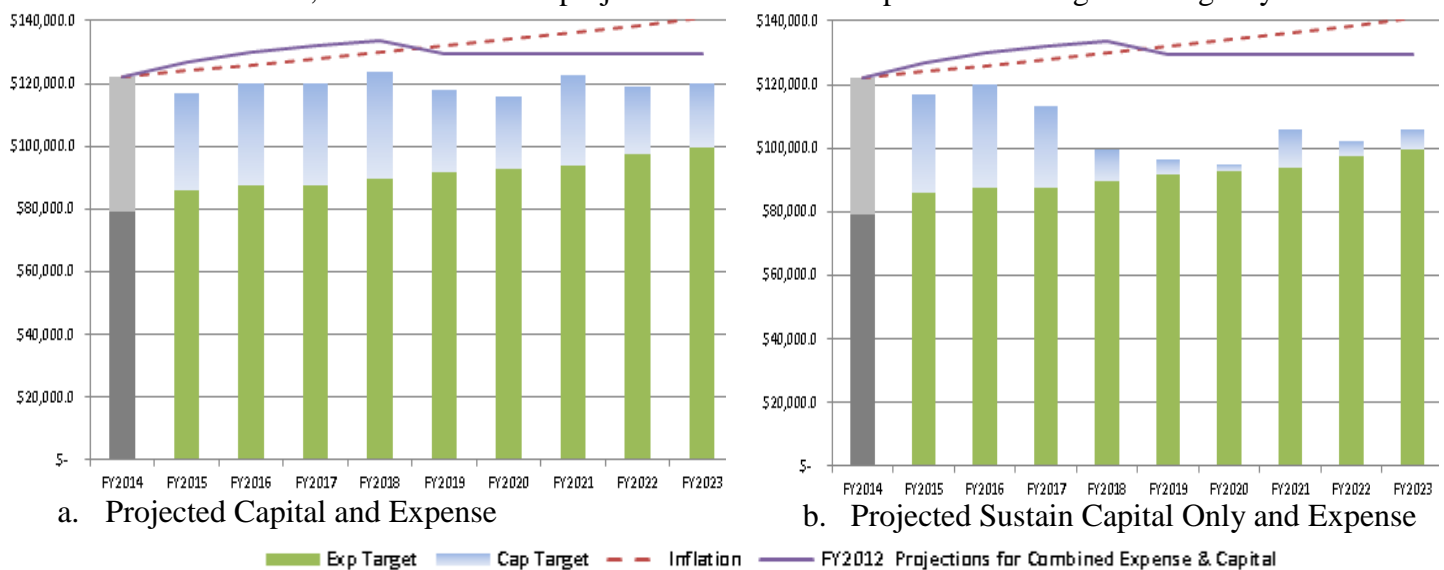
**FY 2014 BPA IT Asset Strategy Plan****2.0 Information Technology Asset Overview**

This chapter presents a collective overview of the information technology assets, providing a high-level assessment of the status of these assets, the organizational goals for these assets, and the high-level risks confronting these assets and our asset strategy. Subsequent sections will cover each asset category in detail.

The FY2014 IT Asset Strategy has several significant shifts from the FY2012 Strategy. These include shifts in our approach toward our assets and the services they provide, and our funding requirements. The main shifts in our funding requirements include:

- Increased emphasis on leveraging innovation in IT to meet business needs while controlling costs
- Strengthening alignment between automation investments and Agency strategic initiatives
- Increased need for expense and reduced need for capital
  - Future infrastructure projects are projected to need more expense and less capital due to a combination of individual component costs and capitalization rules
  - Anticipation of increased number of systems that will need major upgrades, requiring expense funding instead of capital
  - Anticipation that more solutions will use cloud based services (aligned with OMB's cloud first guidance), which would result in requiring expense funds to implement instead of capital funds

Taking the factors impacting funding into account has resulted in a reshaping of the IT capital and expense spend profile (the impact of these factors are covered in detail in this chapter and individual asset category chapters). Figure 2.1 shows the reshaped spend profile. Figure 2.1.a reflects what we anticipate our capital and expense requirements will be; however Figure 2.1.b reflects our funding level. The differences are: beginning in FY2015, IT projects with investments above \$3M will need to compete at the Agency level for funding, and beginning in FY2018, all IT non-sustain projects will need to compete for funding at the Agency level.

**Figure 2.1: Projected Target IT Capital and Expense (\$K)**

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As discussed in chapter 1, and shown in Figure 1.2, there are uncertainties associated with the target funding levels. If all of these uncertainties were to fully manifest on the high side in each year, then the High Spending profile would be \$27.1M higher than the FY2012 spend profile for FY2014-FY2017. Conversely, if all of the uncertainties were to manifest on the low side then the Low Spending profile would be \$60M lower than the FY2012 spend profile for FY2014-FY2017. These represent bounds and we do not expect the uncertainties to occur solely on the high or low side. The uncertainties, both high and low, are discussed in detail in each of the asset category chapters.

Changes in our approach to our assets and the services/capabilities they provide include:

- Differentiating between core vs. non-core assets and services
- Increasing emphasis on innovation to:
  - Reduce infrastructure operational costs
  - Provide business solutions
- Reducing the number and amount of infrastructure projects (sustain spending) and increasing the resources we allocate to meet business needs (discretionary spending)

We have begun to adopt a process of thinking about services and capabilities we automate in terms of being “core” to BPA’s mission. Core is not the same as the critical business classification.

Critical business classification refers to stringent availability and RTO requirements. A large portion of critical business systems will also be core systems; however, there are non-critical

systems that have a “core” designation. The reason we are adopting the new core classification is to be able to prioritize investments, work, and resources around what is fundamental to enable BPA to achieve its strategic business objectives and fulfill its mission.

**A Core IT Asset** delivers a service or capability that differentiates BPA in the market place by meeting one or more of the following conditions: Uniquely provides BPA a competitive edge; Enables the marketing of services and products at a lower rate; Manages the Federal Columbia River System, including power generation, power scheduling, power transmission, or transmission scheduling; Enables BPA to meet its responsibilities as a Balancing Authority; Manages fish/wildlife obligations; Is required by regulation.

Our past intense focus on cost efficiencies has severely limited exploring new technologies outside of specific capital projects and delayed the implementation of many general service innovations – innovations that span more than one business unit. In other words, we have been experiencing a competition between cost efficiency and innovation with cost efficiency being favored over innovation. However, in the recent years, IT has begun to transition from its intense focus on cost efficiencies to a combination of leveraging innovation to transform BPA and using innovation to continue to achieve efficiencies.

We have already begun to leverage innovation through our infrastructure capital projects to help deliver future cost efficiencies. When we compare the projects in our Infrastructure portfolio with the Top IT Projects<sup>8</sup> in Table 2.1, we see that we are aligned or strongly aligned with 13 of industry’s 16 top projects. We also observe from this table that like us, IT in industry is seeking to leverage emerging and evolving technology to improve performance while reducing out-year operational costs.

<sup>8</sup> Jonathan Feldman, “Credibility Problem”, Information Week, 14 May, 2012. Survey of 453 business technology professionals, March 2012.



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<b>Top IT Project</b>	<b>BPA Alignment</b>	<b>BPA Benefit</b>
Improve Security (24%)	Strongly Aligned	Provide secure and reliable operations by continuously evolving to meet emerging security threats.
Increase server virtualization (23%)	Strongly Aligned	Control and reduce datacenter operational costs by reducing the number of physical servers and increasing the ratio of servers to administrators.
Upgrade network infrastructure (17%)	Aligned	Maintain reliable and secure networks. Transition to IPv6 to comply with OMB directive planned for FY2015-FY2016.
Upgrade storage infrastructure (17%)	Strongly Aligned	Control escalating cost of storage through thin provisioning, tiered storage, and targeting storage solutions by workload.
Build or improve big data analysis system (16%)	Aligning (start in FY2014)	Reduce reliance on IT staff to develop/modify reports. Enables business to access data, and discover trends and associations in order to shorten the time to make business decisions.
Adopt or increase use of public cloud services (13%)	Aligned	Control and reduce cost of operations and/or services through reducing staff or avoiding staff increases and avoiding or reducing infrastructure costs. Increase speed of solution delivery. Comply with federal guidance to consider and adopt cloud-based solutions.
Deploy or upgrade enterprise ERP system (13%)	Aligned (strategy being developed)	Provides prioritization of changes to ERP systems to meet evolving business needs. Moves toward optimizing cost expenditures on ERP systems.
Deploy virtual desktops (12%)	Strongly Aligned (55% penetration)	Align process and industry practices to deliver secure, reliable services at a lower cost of ownership. Leverage technology to provide superior services to end-users.
Create Web apps for smartphones, tablets, and PCs (11%)	Aligning (currently for PCs only)	Provide cost effective common access to data and systems across multiple devices and operating systems by leveraging HTML5 and CSS.
Deploy a private cloud infrastructure (11%)	Aligning	Align processes and industry practices to deliver secure, reliable services with lower cost of operation of the datacenter. Aligns with server virtualization.
Upgrade wireless network (10%)	Strongly Aligned	Increases organizational flexibility and resilience.
Deploy mobile device management system (8%)	Aligned (investigating)	Align process and industry practices to deliver secure, reliable services with least cost of ownership. Supports access from any device, anywhere, at any time.
Launch or upgrade an enterprise collaboration system (7%)	Aligned	SharePoint has been used as one of our collaboration systems. The new collaborative features within SharePoint continue to drive the growth and usage of SharePoint.
Develop native apps for smartphones or tablets (4%)	Not Aligned	Seek to avoid complexity of maintaining and securing applications across multiple platforms and operating systems.
Launch or expand IT service initiative such as ITIL (4%)	Weakly Aligned moving to Alignment	Beginning to adopt maturity frameworks to provide continuous service improvement and to help control operational costs.
Launch or upgrade an enterprise social networking platform (2%)	Weakly Aligned	As time permits, investigate and validate the benefits claimed for social applications.

**Table 2.1: Top IT Projects**

Not all of these top IT projects will result in cost efficiencies. The top project, improve security, represents some net new cost to the IT operations budget. One of the major initiatives J will be initiating in FY2014 will be standing up and operating a 24x7 Cyber Security Operation and Analysis Center (CSOAC), which will place an upward pressure on the IT operations budget from new staffing requirements. In a similar vein, IT will be updating both



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its external facing websites and internal network to IPv6 to conform to OMB directives. To minimize both cost and disruptions from transitioning to IPv6, this change in the network protocol will be timed to coincide with a major refresh of network components and the move to 10Gb/s for the core network.

Through the infrastructure portfolio, J is using innovation and automation to drive efficiencies to control costs while improving services. The main drivers in the information technology expense budget come from the Work Plan's discretionary projects, which are delivering new assets into the Application Portfolio along with new operations and maintenance costs.

IT has begun a shift to a combination of balancing leveraging innovation to transform BPA, to achieve business objectives, and using innovation to continue to achieve efficiencies.

IT is projected to have an increasing need for expense and a decreasing need for capital. Combined capital and expense Target funding levels for both FY2014-FY2017 and FY2014-FY2023 are projected to be lower than in the 2012 IT Asset Strategy spend profile.

**2.1 Performance Objectives**

We are transitioning from being primarily focused on achieving cost efficiencies in our IT services (reducing and controlling costs) to a dual strategy that leverages technology to continue to achieve efficiencies (both in IT services and business services) while becoming a stronger strategic partner in identifying and delivering the right assets (solutions) that enable BPA to achieve its business objectives. We will discuss both aspects of this strategy in detail, beginning with cost efficiencies.

**2.1.1 Expense Performance**

In FY2005 BPA centralized information technology functions and services from multiple units across the enterprise with the mandate to reduce and contain the cost of information technology through improved and efficient management of information technology assets. The overarching strategy has been to drive costs out of infrastructure operations through a combination of:

- Reducing cost and complexity through standardization,
- Adopting new refresh strategies,
- Increasing automation of information technology tasks, and
- Continuous process improvement.

Figure 2.2 shows that our approach has been successful in managing the maintenance and operations cost of information technology's assets. Our strategy of focusing on achieving IT services efficiencies has saved BPA \$42M from FY2005 to FY2012<sup>9</sup>, as discussed at length in the FY2012 IT Asset Strategy. However, some of these saving came from delaying and/or slowing down hardware refreshes.

<sup>9</sup> As measured from the difference between FY2005 actuals with yearly inflation plus new service contracts and each year's actuals

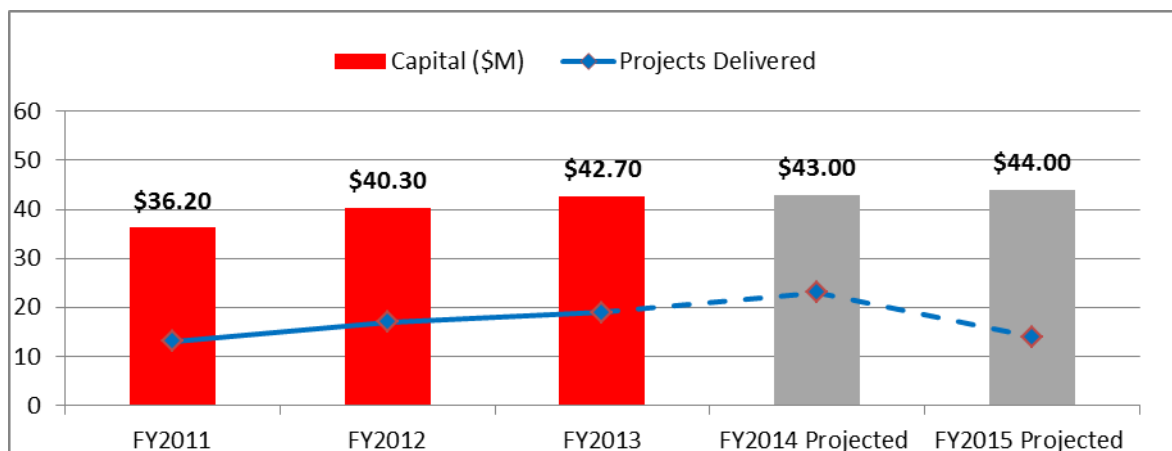


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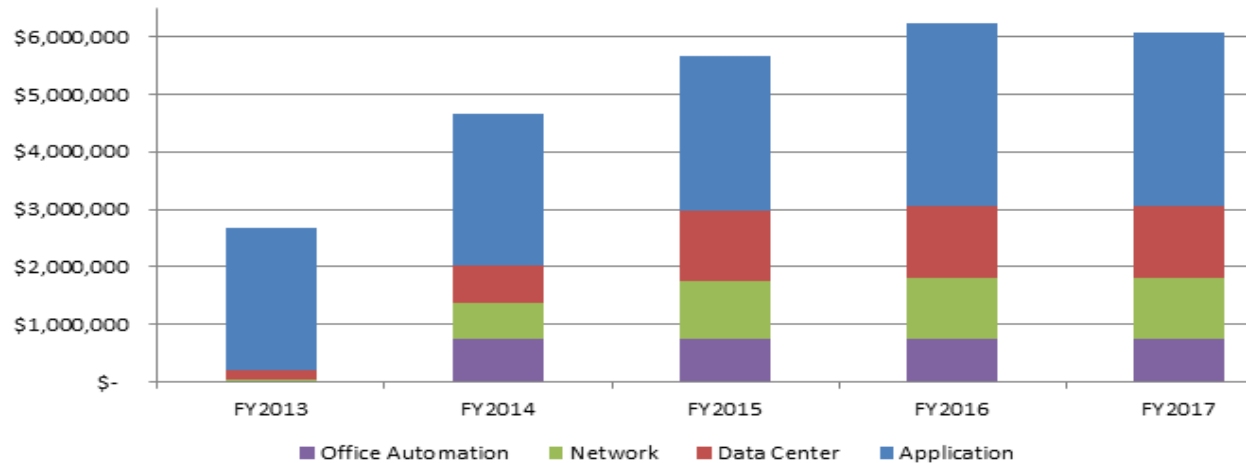
**FY 2014 BPA IT Asset Strategy Plan****Figure 2.2: IT Expense Actuals**

We see a jump in our expense requirements between FY2012 and FY2013, which is driven by a combination of refreshing our personal computing devices after years of deferment (resulting in a large increase in expense material costs for laptop and desktop computers) and absorbing the new support costs of new systems being delivered into production.

Figure 2.3 shows that in FY2012 we delivered 17 new systems into production, increasing to an expected delivery of 23 new systems in FY2014. These 17 new systems delivered in FY2012 also brought a large jump in the Application Portfolio support costs as can be seen in Figure 2.4. As a rule of thumb, we are averaging an increase in on-going annual operations & maintenance and enhancement costs of 5% of the original capital investment for new software systems delivered into production.

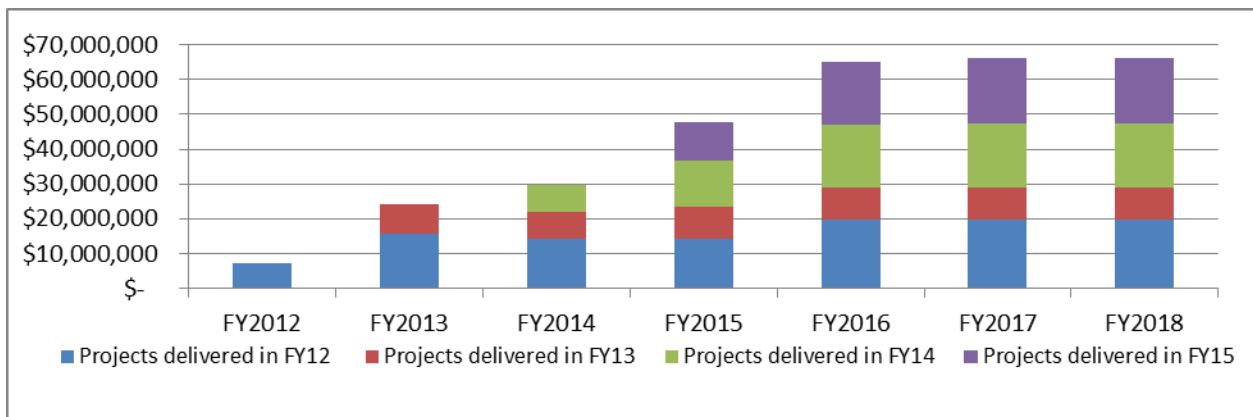
**Figure 2.3 Project Delivery and Capital Expenditures (\$M)**

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**FY 2014 BPA IT Asset Strategy Plan****Figure 2.4: New Contracts and Operation & Maintenance Costs from FY2012 Projects**

Returning to Figure 2.1, there is a large increase in expense funding from FY2014 to FY2015. Drivers for this increase include:

- Programmed operations & maintenance costs resulting from moving 23 new systems into production in FY2014 (see Figures 2.3 and 2.4)
- Changes in network circuits to provide additional bandwidth and network resilience, and to align with DOE guidance to conform with Trusted Internet Connection policy
- Cabling to phase out aging CAT 3 cabling and move to CAT 6a cabling to support VoIP and Power over Ethernet (POE)
- Adopting Tablets
- New managed printer contract<sup>10</sup>
- Upgrading firewalls- expected to now require expense due to lower server costs; however, programmed capital in FY2012
- Planning transition to IPv6 per OMB policy/directive
- Refreshing BPA's internet site (external facing DMZ) – expected to now require expense due to lower server costs; however, programmed capital in FY2012



<sup>10</sup> Due to deferring printer refreshes we have an extremely old heterogeneous printer fleet with a corresponding high support costs, see Chapter 3 on Office Automation for details. Managed Printing is intended to be cost effective solution to our escalating printer costs where we contract for both printers and support.





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**FY 2014 BPA IT Asset Strategy Plan****Figure 2.5: Business Benefits for Projects Delivered in FY12-FY15**

Although IT is incurring new operational costs from delivering new systems (Figure 2.4), these new systems are creating and delivering business benefits.

Figure 2.5 shows the expected business value our Work Plan is expected to generate by year. Although we have been maturing our business cases over the last several years to improve identification of the business benefits, until FY2013 we have not implemented a formal process requiring the business units to track and measure the business value over time. We are now requiring projects to not only identify business benefits, we are also requiring a formal Post Implementation Audit Plan be put in place and signed off by both the business owner and the IT Asset Manager. The audit plan documents the metrics the business will put in place to measure the business benefits from the new system<sup>11</sup>. The business owner will present a report on the business value to the APSC 6-12 months after the system goes live. The IT Asset Manager will review business value metrics on an annual basis. We are institutionalizing these practices through the SLC.

New IT systems generate business value realized by the Agency and individual business units while IT incurs new support costs. In other words, new systems create a net new upward pressure on the IT expense budget.

Since the majority of the infrastructure projects are primarily hardware refresh projects (core sustain projects) the majority of business benefits are driven through the Application Portfolio. Given that approximately 50-60% of the IT capital program (about \$20-24M/year) is used to deliver new systems to our Application Portfolio, Figure 2.5 indicates that we should typically recoup our annual investments through our business benefits over a 3-4 year period (individual projects may have shorter or longer periods). As we mature our business metric practices, we will be able to improve our ability to validate the performance from our investments.

Expense requirements are projected to increase due to a price drop in many infrastructure hardware components (requiring expense instead of capital funding), increased adoption of cloud based services, and anticipation of an increase in new systems being delivered through the PMO Work Plan which will result in increased future operation and maintenance costs.

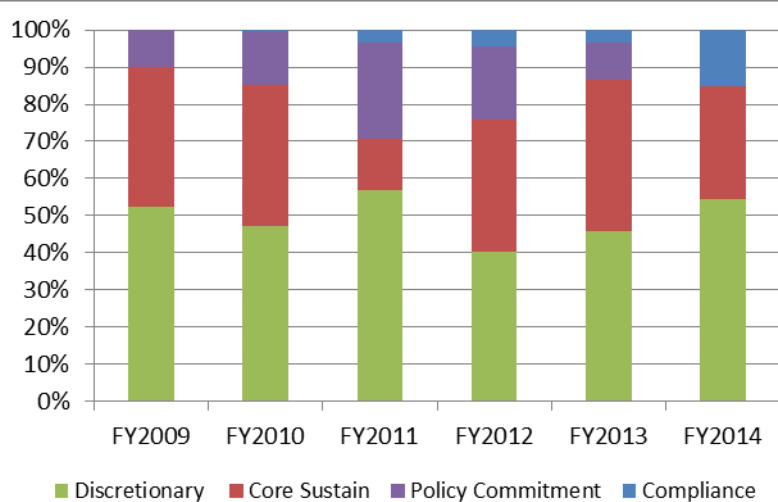
<sup>11</sup> Currently metrics are only required for benefits greater than \$150,000/year



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**FY 2014 BPA IT Asset Strategy Plan****2.1.2 Capital Performance (Strategic Priorities and Partnership)**

We are completing several major infrastructure projects to modernize our infrastructure. This is reflected in the percentage of our capital program we have been spending and are projected to spend on infrastructure projects. Figure 2.6 shows capital infrastructure dropping from 40% to 20% of the IT capital budget. Our expectation is that infrastructure projects will constitute 15% to 25% of the capital budget in the out-years. We are also projecting a drop in policy commitment funding with the completion of the Regional Dialogue (REV<sup>12</sup>) related projects. The consequence of this shift is that we anticipate 60-80% of the capital budget will be allocated to discretionary projects to implement BPA strategic business value and meet business needs while delivering new business value to BPA.



**Figure 2.6: Capital Funding by Investment Category Classification**

Our business automation investments can be viewed and classified in a number of ways. The infrastructure projects are geared toward maintaining reliable and secure services, and are typically classified as core sustain. A number of projects are initiated to ensure BPA complies with federal or industry regulations, and these are classified as compliance<sup>13</sup>. We also have a number of projects that are essential to meeting policy commitments<sup>14</sup> made by BPA. The remaining projects are discretionary projects undertaken to achieve business opportunities, reduce risks, reduce operating costs, or improve internal efficiency.

Although we will be transitioning to largely discretionary projects with our capital funding, IT has a number of important infrastructure and non-core foundational projects planned in the FY2015-FY2017 timeframe, as well as potential compliance project(s) to align with NERC CIP revision 5. The infrastructure projects include transitioning our network to IPv6 and to 10Gb/s core and implementing a Business System Disaster Recovery (BSDR) capability. Both of these investments are included in Table 2.2.

BSDR capabilities will come with new support requirements and most likely new capital requirements. It is still early in the planning process to determine which solution we might

<sup>12</sup> The Regional Enterprise Value (REV) program was a collection of 14 IT projects that were needed to support implementation of standardized 20-year power contracts (called Regional Dialogue contracts). These long-term contracts tied BPA power rates to calculations using a Tiered Rate Methodology (TRM). The REV program managed 14 IT projects that were tracked and monitored individually.

<sup>13</sup> Compliance projects are investments to achieve compliance with directives, orders, or contracts within 3 years

<sup>14</sup> Policy Commitment projects are investments required to fulfill commitments made by BPA within 3 years



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select. We have identified at least three alternatives: (1) Cloud based solution (expense required and unknown at this time); (2) Relocation of our Test and Integration Environment to our alternate datacenter to serve as a failover site during an emergency (estimate of \$2M in expense and \$5M in capital); and (3) Build out failover capabilities at alternative datacenter (up to \$13M in capital). These alternate approaches represent sufficient differences in funding requirements and account for a good deal of the range between low and high capital in FY2016 and FY2017.

<b>Core Sustain Capital Target, High and Low Funding Levers</b>											<b>FY 2014- 2017</b>	<b>FY 2018- 2023</b>	<b>FY 2014- 023</b>
<b>CAP (\$K)</b>	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>			
Target Cap	15,967	6,240	11,800	8,386	10,036.0	5,036.0	2,500	12,000	4,736	6,536	42,393	40,844	83,237
High	15,967	8,640	15,800.	10,386	12,446	6,036.	3,500	12,000.	4,736	7,536	50,793	46,254	97,047
Low	15,967	6,240	3,800	3,386	10,036	4,036	2,500	2,000	736	6,536	29,393	25,844	55,237

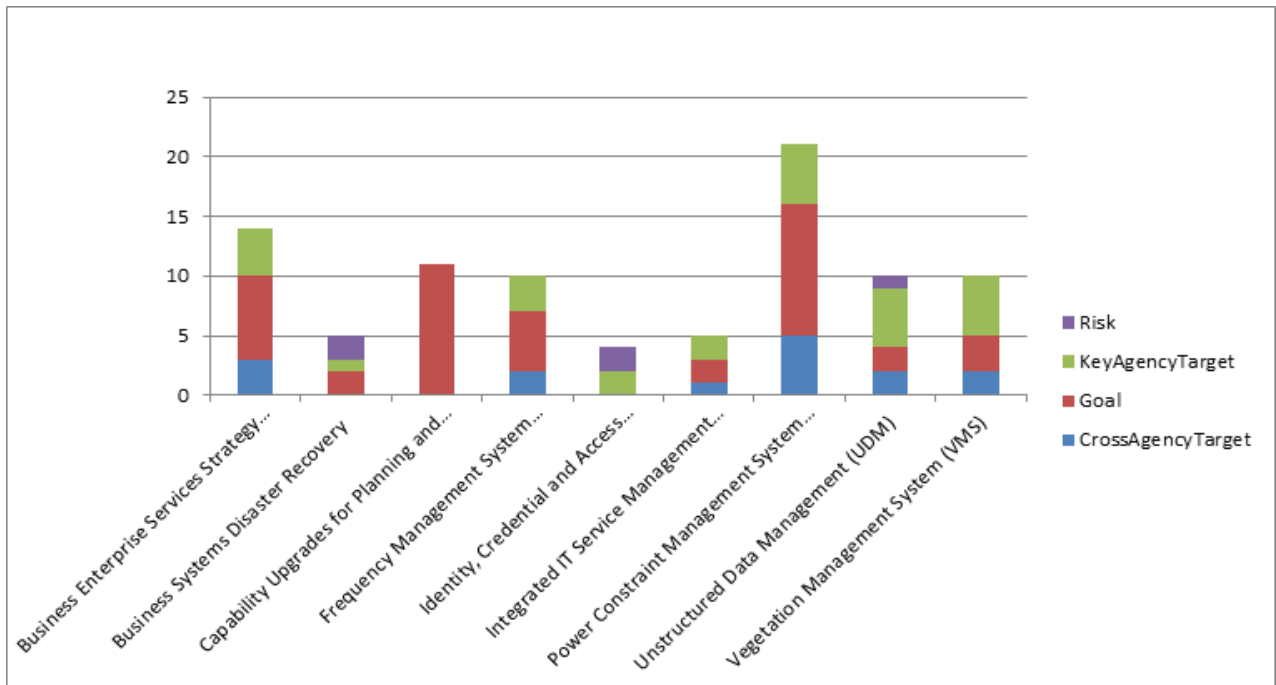
**Table 2.2: Core Sustain Capital Profile**

In addition to core sustain projects, IT is looking to initiate some foundational capabilities. The first is developing a BPA Common Information Model (CIM) based on industry standard CIM. The intent is to create a logical data and service map for BPA functions to aid in data standardization, improve data quality(data accuracy, completeness, and synchronization), aid in system integration, and enable self-service business intelligence(BI). The second initiative is to establish a Business Intelligence Competency Center (BICC) to facilitate self-service BI through establishing tools, practices, and competencies

As we transition to a majority of discretionary investments, we will also review our investment portfolio to ensure that the investment not only meets individual business unit's needs, but also meets BPA-wide priorities. We will use several techniques to help us assess the effectiveness of our portfolio. One technique is shown in Figure 2.7, where we have mapped how each new investment in our FY2014 portfolio contributes to meeting BPA-wide objectives through a combination of addressing a BPA-wide risk, goal, Key Agency Target, and/or Cross Agency Target.



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**FY 2014 BPA IT Asset Strategy Plan****Figure 2.7: Map of Investments/Projects to BPA Priorities**

The capital program is transitioning from large investments in infrastructure and policy commit (with a high of 60% of capital funds) to discretionary expansion to meet business needs, moving from a low of 40% to an estimated 75-80% of capital spending, and delivering measurable benefits to BPA.



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**FY 2014 BPA IT Asset Strategy Plan****2.2 Infrastructure Asset Refresh Rates**

We refresh our infrastructure assets based on a combination of industry best practices and BPA's desire to optimize value in its investment. As a rule, BPA maintains hardware one to two years beyond industry recommendations. Although this approach does increase risk of failure in the latter year of operations, in a practical sense this has not had an adverse impact on BPA's environment. Critical systems are redundant by design, reducing the risk of operational disruptions. The increases in replacement costs from hardware failure in the year leading up to a refresh cycle are offset by lower operating costs provided by maintaining environmental stability, allowing BPA to optimize the value in its investments, keeping the overall total cost of ownership lower than adhering strictly to industry recommendations. Table 2.3 shows the refresh rates for BPA's major infrastructure assets.

<b>Infrastructure Category</b>	<b>Refresh Rate</b>	<b>Last Major Refresh Date</b>
Servers	5 years	FY 2014
Storage (SANs and Fabric)	5 years	FY 2013 <sup>15</sup> Replace at end of life
Desktop	5 years	FY 2014 <sup>16</sup>
Laptop	5 years	FY 2014
Thin Clients	7-10 years	FY2013/FY2014
Tablets	3 years	Begin deployment in FY2014
Network Printers	5 years <sup>17</sup>	Move to Lease in FY2014
Network devices	7 years	FY 2003, Field FY2013
Wireless devices		FY2013
Cable Plant	14 years	FY2009 Headquarters FY2010 Ross Complex (Partial)

**Table 2.3: Hardware Refresh Schedules**

Prior to FY2009, BPA scheduled annual refreshes of its infrastructure assets. For example, our target for refreshing our fleet of workstations was 20% each year. Due to a number of pressures, including meeting expense targets, we have failed to consistently meet our targets for infrastructure refreshes. As a result, we re-examined our approach to infrastructure refreshes and have adopted a planned complete refresh of an asset infrastructure category (e.g. server, desktop, network, etc.) based on the asset's refresh rate (this is termed a forklift refresh), see Table 3. For example, every five years we will refresh the desktop fleet of personal computers. As part of the refresh, we will implement new operating systems and upgrade the base image components (i.e. Office Suite, web browser, etc.). This approach offers the following benefits:

- Reduces disruption to operational environment
- Maintains a highly homogenous and standardized environment which reduces operational costs
- Maximizes hardware discounts through high volume purchases
- Optimizes total cost of ownership of infrastructure assets

Drawbacks to this approach include delays in taking advantage of hardware innovations. Hardware devices do fail between refresh cycles, with the failure rate increasing toward the

<sup>15</sup> 2009/20010 was last major refresh of SANs – we have begun adding new devices in 2013 as part of the IVC project

<sup>16</sup> Only replacing units that fail since 2007; however, number has increased due to delay in deploying Windows 7

<sup>17</sup> We are planning a transition to managed print services. Under this arrangement we will lease the printers and the printers will be refreshed as part of the managed services.



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end of the refresh cycle. However, the benefits outweigh the drawbacks, leading to an overall lower cost environment. SAN storage is an exception to the wholesale refresh paradigm due to the scale of change in re-hosting all of our data on new equipment in a short time period.

We expect to complete two wholesale replacement projects in FY2014/2015 (we completed Data Center Modernization Project (DCM) which was a wholesale replacement of our critical business system datacenter infrastructure in FY2012). These projects are IT Virtualization and Consolidation (IVC), which refreshes our business systems datacenter environment, and Desktop Modernization Project (DMP), which establishes our virtual desktop environment. These projects will be refreshing our infrastructure assets as well as delivering improved management and monitoring tools. The combination of a highly standardized infrastructure, with improved management and monitoring, will allow us to control the growth of expense dollar needs in these areas to rise at or below the rate of inflation.

Through our adoption of our refresh strategy, we anticipate being able to minimize disruptions and reduce costs from modernization efforts, allowing capital to more effectively be targeted to meet business needs.

**2.3 Applications/Systems Refresh**

There is not a standardized refresh schedule for IT software systems. We maintain IT software systems while the systems continue to meet business needs and are cost effective. Upgrades and replacements are considered discretionary and are either expense or capital projects. Capital spending for delivering new systems or upgrading existing systems is projected to increase from 40% to 80%<sup>18</sup> of the annual IT capital budget. Supporting automated business systems now accounts for an average of 40% of the IT expense budget. New automated business systems result in new support contracts, new operation & maintenance costs, and ongoing enhancement costs.

Applications are introduced to meet business needs and stay in service until the business unit(s) indicates they are no longer meeting business needs or can no longer be supported. At this point we consider the options of (a) modifying/enhancing the system to meet the business unit's evolving need, (b) upgrading the system to take advantage of new capabilities, (c) replacing the system, or (d) retiring the system with no replacement.

Consequences from our current business driven approach include:

- We have not developed a systematic approach to measuring the value and performance of our applications and systems
- We have not developed a long range (more than 2 years) roadmap for the evolution of systems
- We have not developed targets for system replacement or retirement

In FY2010, BPA began the process of developing asset plans to address our applications and systems. This process is proving to be a great aid in enabling both the business units and information support teams to work together to rectify these deficiencies. We are beginning to develop performance and value metrics for our major systems. We have also started to create a long-term strategic plan for our supply chain, financial, and human resources systems.

<sup>18</sup> With the completion of major infrastructure projects in FY2014/FY2015, we expect capital requirements to drop substantially with business systems accounting for 80% or more of capital expenditures





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**FY 2014 BPA IT Asset Strategy Plan****2.4 Key Accomplishments**

The Information Technology Asset Strategy has delivered sufficient new capabilities and services to meet business needs and to reduce the cost of infrastructure operations. A brief review of the accomplishments over the last two years is provided for the Application and Infrastructure portfolios.

**2.4.1 Applications**

Figure 2.3 shows a large influx of new systems delivered as a result of the PMO Project Work Plan, particularly in the FY2012/FY2013 timeframe. These new systems are delivering new key services and capabilities to meet the agency's critical business needs. Figure 2.5 shows the anticipated value from these systems. A partial listing of these delivered major systems includes:

- Transmission Asset Management
- Revenue Forecasting
- Rates Analysis Model
- Customer Data Management
- Dynamic Modelling
- RODS Retirement
- Loads Obligation & Resource Analyzer
- Regional Dialogue Scheduling Systems
- Customer Portal
- Long Term ATC Management Tool
- Electronic Official Personnel File (SaaS)
- ProWatch Phase 2
- eDiscovery (Exchange Email)
- Equivalent ATC for ARC Paths

**2.4.2 Infrastructure**

We have implemented the first phase of our datacenter consolidation and virtualization for the Critical Business Systems (CBS) datacenter environment in FY2012 through the Data Center Modernization Project (DCM). The second and final phase, IT Virtualization & Consolidation (IVC), is running behind schedule. We are beginning transition to the IVC delivered environment in first quarter FY2014 and will not be fully completed until first quarter FY2015. Consolidation, virtualization, and leveraging management tools are a linchpin in our strategy to lower datacenter operating costs through server reduction, automation, and standardization. When we compare our virtualized environment (DCM) to non-virtualized environment we see that our system administrators managing the CBS environment are able to manage twice as many operating systems per administrator than in our non-virtualized environment (84 operating systems per administrator compared to 40 operating systems per administrator in our non-virtualized environment). This trend gives us confidence that we will be able to control the growth of the data center's operations and maintenance cost at or below the rate of inflation as we complete deploying and migrating into our new environments.

Although our move to virtual desktop infrastructure is behind schedule (estimate completion second quarter FY2014), this initiative has made a number of significant improvements. This project will be delivering additional benefits by enabling secure access to our network resources - enabling an "any device, anywhere, anytime" access capability. This supports teleworkers and sets the foundation for BYOD capabilities.








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**FY 2014 BPA IT Asset Strategy Plan****2.5 Information Technology Asset Goals and Objectives**

IT continues to strive to increase its partnership with BPA business units to optimize the use of information technology resources and assets, enabling BPA to meet strategic objectives while efficiently and securely performing daily operations. This shift is described in detail in previous IT Strategic Plans. It encompasses optimizing resources and balancing the individual business units' needs with overarching BPA objectives, while controlling cost. Due to the long life cycle of systems at BPA, it will require more than 10 years to fully transition to an agile and flexible system environment.

The Information Technology Asset Portfolio has been divided into sub-portfolios for better management of the assets. Each of these sub-portfolios has its own unique table of objectives that maps the sub-portfolio objectives to the Information Technology Asset Strategies in table 2.4. These sub-portfolio objectives relate to a single primary goal indicated by "P", and may also relate to secondary goal(s) indicated by "S". Below is a table that summarizes how the individual Information Technology Asset plans are collectively meeting the IT Asset Goals. An upward arrow in the status column indicates improving, a downward arrow shows we are declining in meeting the goal, and a sideways arrow indicates we are maintaining status quo.


<b>IT Asset Goals</b>	<b>Status Meeting Goals</b>	<b>Comments</b>
ITAG1: Enable BPA to reliably and securely use IT resources to effectively and efficiently perform work while maximizing utilization of IT resources.		IT Virtualization and Consolidation and Desktop Modernization Project are both delivering virtualized environments, which will improve resource utilization and provide more secure and reliable computing environments. These projects will drastically improve the manner in which core IT services are delivered. Both projects are behind schedule in delivery. However, they are scheduled to deliver new capabilities in FY2013 and to complete in FY2014.
ITAG2: Optimize total cost of ownership by balancing the costs of new investments for upgrades and replacements with operation and maintenance costs.		Converting the refresh strategy from a percentage annual refresh to a forklift <sup>19</sup> approach will optimize the investment in servers, storage, and desktops, while reducing the cost associated with refreshing equipment. Tying the refresh with operating system upgrades will also reduce user disruption and reduce cost of performing upgrades. Experience with these forklifts will help simplify future forklifts. IT is currently projecting that all infrastructure categories will grow at or below the rate of inflation.
ITAG3: Balance individual business unit's immediate requirements with BPA strategic objectives by delivering flexible and extensible assets that meet current objectives and can be leveraged to meet future strategic business objectives, resulting in reduced future delivery times and least total cost of ownership.		Although the PMO has a mature process for managing business needs, the practice of Enterprise Architecture is maturing. Introducing enterprise architects to perform high level alignment across multiple projects has only achieved limited success at best. The majority of projects being delivered are still designed to meet individual business unit needs and are not optimized to provide long term enterprise solutions.

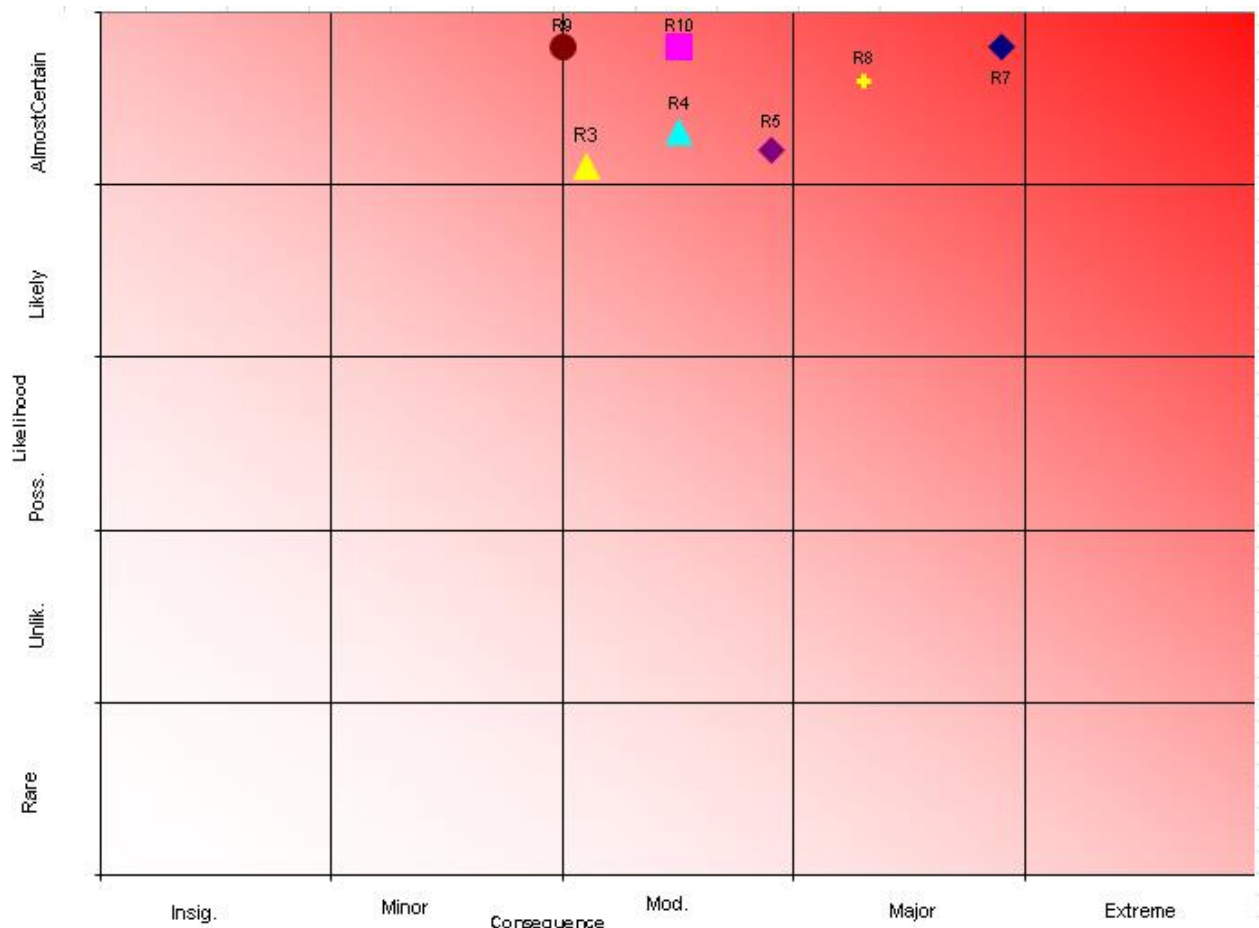
<sup>19</sup> Forklift is an approach when all hardware is replaced in a relatively short time period. This approach creates a highly homogenous environment and enables cost savings resulting from discounts associated with bulk hardware buys.



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**FY 2014 BPA IT Asset Strategy Plan**

IT Asset Goals	Status Meeting Goals	Comments
ITAG4: Institutionalize Operational Excellence through the adoption of maturity models to continuously improve processes, practices, and service delivery, maximizing the value of our IT assets and reducing the cost of operation and maintenance.		Both the IT Virtualization & Consolidation and Desktop Modernization Projects include advancing operations along a maturity model. The Software Development and Operations manager is exploring several maturity models such as the Software Engineering Institute's Capability Maturity Model, and the Electricity Subsector Cyber-security Capability Maturity Model (ES-C2M2).

**Table 2.4: Status of Information Technology Assets Collectively Meeting High Level Goals****2.6 Risks to IT Assets****Figure 2.8: IT Asset Risk Heat Map**

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**FY 2014 BPA IT Asset Strategy Plan**

<b>ID</b>	<b>Risk</b>		<b>Issues</b>	<b>Mitigation</b>
	<b>Likelihood</b>	<b>Impact</b>		
R3	Failure to fund reliable operation and maintenance for new assets delivered by capital projects.		Capital projects are delivering new assets to the Applications Portfolio each year. However, there has been no linkage between approvals of these capital projects and the associated expense burden required to reliably support these new assets. Agency/business units receive benefits while IT foots the bill for maintaining automation. This results in new software contract costs and labor costs, while reducing funding available for enhancements.	Develop a process to increase operation & maintenance budgets to accommodate new service contracts and support staff .  Mitigation needs to be focused on working with business to include prioritization of expense costs in project approval and adjust funding based on services received.
	Almost Certain	Moderate \$1M-\$10M		
R4	Failure to adequately fund enhancements to meet evolving business requirements.		Capital projects are delivering new assets to the Applications Portfolio each year. However, there has been no linkage between approvals of these capital projects with the associated expense burden required to reliably support these new assets. New assets often also are delivered with a backlog of enhancements that were not planned for when budgets were developed. New O&M (contracts & staff) costs from new systems are diverting resources from enhancements.	Develop a process to either increase operation & maintenance to preserve enhancement budgets and/or establish transparency on which enhancements will be curtailed. Asset plans need to link enhancements to business objectives and/or mitigating risks. Project business cases must show linkage between project and business objectives and/or risks.
	Almost Certain	Moderate \$1M-\$10M		
R5	Failure of projects to deliver full scope of initially identified capabilities resulting in reduced benefits and/or backlog of enhancements that must be completed using expense dollars to realized benefits		Not all projects have been fully capturing and implementing business requirements, resulting in a backlog of enhancements which are putting upward pressure on expense budgets. In addition, some project have reduced their scope to meet timelines and/or budgets resulting in a backlog of desired enhancements to meet and implement the original scope.	Augment SLC to capture enhancement backlog throughout execution and transition. Either hold project in transition phase to resolve backlog or augment enhancement budgets to address - may still have a staff resource issue.
	Almost Certain	Moderate \$1M-\$10M		
R7	Failure to align IT Initiatives with Business Objectives & Risks, with clear identification of benefits, leading to a sub-optimized prioritize list of initiatives.		Lack of clear Agency-level priorities of IT resources Business lines havnot been providing IT with mid and long-term business initiatives to inform IT planning and strategy development. Business lines are maturing in the use of well formed benefits and costs to prioritize projects	Leverage Portfolio Managers and Asset Plans to assist business leaders in identifying future needs. Mature enterprise architecture practices to include aligning project with Agency strategic business objectives and identifying connections between projects.
	Almost Certain	Major \$10-100M		
R8	Failure to fund operational security & compliance to meet Agency goals; including sufficient resources to meet NERC-CIP requirements		Potential for unplanned remediation projects to correct deficiencies discovered by CSOAC and NOC monitoring. Potential for new and emerging security compliance requirements spanning IT systems and field sites, especially for CBS and TBL scheduling system.	Create and maintain Security Asset Plan. Have Cyber Security review Assets Plans to ensure operational security and compliance activities are included in each portfolio asset plan to achieve operational security and compliance objectives.
	Almost Certain	Major \$10-100M		
R9	Failure to attract and acquire skilled federal employees needed to transform and maintain IT environment.		Anticipated high and increasing rate of retirees within the next 5 to 10 years. Concern that federal hiring practices places IT at a disadvantage in completing for qualified IT workers, due to lack of agility, at a time when colleges are not producing enough graduates to meet industry needs.	Implement J Workforce strategy. Theme 1 addresses attracting and acquiring talent, which includes implementing a student program. Increase use of managed staffing and services to meet staffing needs.
	Almost Certain	Minor \$100K-\$1M		
R10	Failure to onboard new federal employees in a timely manner with the right skills and aptitudes due to priority placement.		IT specialist (GS 2210 series) are lower in ranking for priority placement resolution. This means there will be a delay before normal hiring practices are resumed for IT specialists. In addition, IT may find that priority placement may require onboarding skills and competencies that are no longer aligned with the IT Workforce Strategy.	Follow IT Workforce Strategy to move federal staff into knowledge management and leadership positions; using training program to reposition existing staff to fill key positions and leveraging new contract vehicles to deliver reliable and stable contractor workforce to augment
	Almost Certain	Moderate \$1M-10M		

**Table 2.5: Risks to IT Assets**

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**FY 2014 BPA IT Asset Strategy Plan****2.7 Information Technology Strategies**

<b>Portfolio Strategy</b>	<b>Benefits</b>	<b>Challenges/Issues</b>	<b>Asset Portfolio Outlook</b>
Drive costs out of Infrastructure through leveraging <ul style="list-style-type: none"> <li>• Standardization</li> <li>• Automation of IT tasks</li> <li>• Process Improvement</li> <li>• Restructuring Refresh Methodology</li> </ul>	Natural outcome of improving operations through standardization and automating IT tasks will both increase operational reliability and lower operational costs. Restructuring refreshes will reduce overall costs of conducting refreshes.	Current IT staff culture does not embrace automation of IT tasks. Implementing automation has been slow, but is proceeding. Reductions in staffing to capture savings (largely avoided contractor hires).	Consolidation and virtualization is behind schedule, however improvements are already being delivered. Benefits for Desktop Modernization Projects are beginning to be realized.
Develop and Implement Work Force Strategy	Reduced time to onboard staff resources. Improved operational reliability. Improved project support. Increased likelihood of business continuity.	40-60% of IT labor will be contractors due to limits on federal billets. Need to develop consensus around which positions are a best fit for federal positions versus supplemental level (avoided contractor hires).	IT has developed a draft, pre-decisional, long term Workforce Strategy. IT needs to develop an implementation roadmap.
Develop mechanism to accommodate shifts from capital to expense.	Enable the adoption of Software as a Service solution when appropriate. Enable rapid response as infrastructure components drop below capital threshold.	Currently no BPA process to accommodate shifts. Rapid evolution of technologies and services in the market place.	Without development of means to reprogram capital to expense, IT runs the risk of either exceeding its expense budget and/or rejecting Software as a Service as a solution when it is operationally and economically preferable.
Develop process to ensure operational funds are in place to reliably support new assets.	Ensures resources are available to reliably support all assets. Avoids reducing resources for enhancements.	Capital projects are being approved to deliver new assets while their support costs are not linked to project approval. Savings from infrastructure improvements are being outpaced by new expense requirements. Expense budgets are not increasing fast enough to meet new operational requirements.	Need to work with BPA stakeholders to development a means to tie approval of capital projects to additional funding required to reliably support new assets. Otherwise, resources available for system enhancements for all assets will need to be reduced to ensure operational reliability of all production systems.
Instill culture of continuous improvement and operational excellence.	Reduction in operations cost. Reduction in development costs. Improved operational reliability. Improved customer satisfaction .	IT staff does not currently have a culture of continuous improvement nor had exposure to IT based maturity models/frameworks.	Process improvement is an element of two infrastructure projects and includes the adoption of an ITIL based maturity framework. IT will be exploring the adoption of a maturity framework to cover software development.

**Table 2.6: Summary of IT Asset Strategies**

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**FY 2014 BPA IT Asset Strategy Plan****2.8 Asset Outcome Measures**

Table 2.7 contains measures for achieving the IT asset objectives. This table includes a number of Key Performance Indicators, which have been developed for assessing the overall implementation of the IT Asset Strategy. The background for these indicators and details are included in Appendix A.

<b>IT Asset Objectives</b>	<b>Asset Portfolio Measures</b>
ITAG1: Enable BPA to reliably and securely use IT resources to effectively and efficiently perform work while maximizing utilization of IT resources.	<ul style="list-style-type: none"> <li>• Software license compliance and recovery of eligible licenses. (IT Performance Indicator – see Appendix A)</li> <li>• Ratio of Windows Virtual Servers to Physical Servers. (IT Performance Indicator – see Appendix A)</li> <li>• Percentage of test and production servers adhering to a certified baseline. (IT Performance Indicator – see Appendix A)</li> </ul>
ITAG2: Optimize total cost of ownership by balancing the costs of new investments for upgrades and replacements with operation and maintenance costs.	<ul style="list-style-type: none"> <li>• Average cost of supporting a personal computing device at BPA. (IT Performance Indicator – see Appendix A)</li> <li>• Printer operation and maintenance costs. (IT Performance Indicator – see Appendix A)</li> <li>• Length of time equipment has been in-service compared with industry recommended benchmarks for age related replacement of equipment. (IT Performance Indicator – see Appendix A)</li> <li>• Data center operation and maintenance costs. (IT Performance Indicator – see Appendix A)</li> <li>• Application Operation and Maintenance costs. (IT Performance Indicator – see Appendix A)</li> </ul>
ITAG3: Balance individual business unit's immediate requirements with BPA strategic objectives by delivering flexible and extensible assets that meet current objectives and can be leveraged to meet future strategic business objectives, resulting in reduced future delivery times and least total cost of ownership.	<ul style="list-style-type: none"> <li>• Utilization of network circuits and links. (IT Performance Indicator – see Appendix A)</li> <li>• Ratio of estimated enhancement backlog costs to enhancement budget</li> </ul>
ITAG4: Institutionalize Operational Excellence through the adoption of maturity models to continuously improve processes, practices, and service delivery, maximizing the value of our IT assets and reducing the cost of operation and maintenance.	<ul style="list-style-type: none"> <li>• Advancing along the ITIL maturity model for Data Center operations.</li> <li>• Advancing along the ITIL maturity model for Office Automation operations level by FY2015 based on Microsoft Operations Framework.</li> <li>• Adopting a maturity model for Software Development</li> <li>• Advancing along Electricity Subsector Cyber-security Capability Maturity Model (ES-C2M2)</li> </ul>

**Table 2.7: Information Technology Asset Portfolio Outcomes**

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**FY 2014 BPA IT Asset Strategy Plan****3.0 Office Automation Portfolio**

Assets in the Office Automation Portfolio are organized into three major categories:

- **Hardware:** the physical IT devices provided to staff to enable them to accomplish their missions.
  - Fixed computing devices (traditional desktop PCs and thin clients)
  - Mobile computing devices (e.g. laptops, smart phones, tablets)
  - Imaging devices (e.g. network or personal printers, copiers)
  - Multimedia/presentation devices (e.g. projectors, conference room flat screens)
  - Specialized devices (e.g. ergo keyboards, scanners, cameras, track balls)
- **Software:** the desktop software titles provided to employees to help them accomplish their missions.
  - All personal computer software titles
- **Tools:** the management software and expertise used by the support staff to manage the Office Automation assets and service delivery.
  - Management software (e.g. MDT/MDOP, SCCM, Mobile Device Management, etc.)
  - Staff knowledge and skills

These assets touch almost everyone in BPA by providing a personal desktop system, mobile devices, print capabilities, and desktop software. The over-arching goal is to provide cost effective and reliable desktop services to enable BPA to perform its mission and achieve its business objectives. There are multiple strategies and combinations of strategies available to IT to achieve a balance between improving services, cost effective delivery of services, the delivery of new and/or evolving reliable desktop services, and the notion of continuous operations in the face of natural or man-made disasters.

One of the strategies that IT has just completed deploying in December 2013, is a virtual desktop infrastructure (VDI). Highlights of this VDI include 34% penetration of thin clients, application streaming, rapid user provisioning, improved telework capabilities, and laying a foundation for BYOD. We will see that the establishment of the VDI environment will serve as a cornerstone in achieving cost efficiencies while providing agile office automation solutions and improving client experiences. Although we have begun to realize the envisioned benefits of this architecture, we were expecting near 50% penetration of thin clients. By far, the most problematic hurdle has been the delivery of specialized personal applications within this environment. We have yet to successfully engender a significant reduction in the number of software titles in our portfolio, which has reduced the penetration of standardized thin clients, and will lead to out-year impacts on labor expense funds as more workstation replacements than anticipated will be required. One active strategy to move the penetration forward is the possible use of persistent virtual desktops, ones personalized to specific individuals, where desktop software titles cannot be rationalized. This has the potential to provide the VDI benefits to those clients, but at an additional cost to the supporting architecture, possibly eroding the desired ROI.

To continue to create an agile and cost effective Office Automation environment, IT must continue to build on standardization and move to leveraging automation and maturing processes.





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**FY 2014 BPA IT Asset Strategy Plan****3.1 Goals & Objectives**

The following table shows the alignment between Office Automation and IT Asset Goals

<b>Office Automation Objectives</b>	<b>Aligns with IT Asset Goals</b>	<b>Outcomes</b>
Leverage technology to provide superior services to end users.	ITAG 1 – P <sup>20</sup>	<ul style="list-style-type: none"> <li>• Features of a Virtual Desktop Infrastructure (VDI) are deployed to enable on-demand delivery of select desktop applications regardless of location to meet the majority of end user requirements, without regard to the end-user device. <ul style="list-style-type: none"> <li>○ Increase telework capability/Increase mobility (Any device, Anywhere, Anytime)</li> <li>○ Improve client satisfaction from thin client performance (less than 20 second connect/login) and flexibility</li> <li>○ Achieve Cost efficiencies from <ul style="list-style-type: none"> <li>▪ Application streaming</li> <li>▪ Lower cost thin client compared to desktop or laptop</li> <li>▪ Workstation standardization</li> <li>▪ Shared components yielding higher utilization rates</li> </ul> </li> <li>○ Expand thin client penetration from 34% to 50%</li> </ul> </li> <li>• Self-service is enabled to allow users self-provisioning of selected software titles.</li> <li>• Software usage is tracked to reclaim unused titles and make them available to other end users, as well as enabling reduction of titles due to low utilization or redundant function.</li> <li>• Improve convenience, reduce waste and improve security/confidentiality by introducing follow-me printing that finds local printers based on where user logs into network and prints when user walks up to printer and enters pin/credentials.</li> <li>• Leverage mobile devices to enable portable persona (allowing clients to choose the form factor – thin client, tablet, smart phone –for connecting into their virtual desktop.</li> <li>• Single Sign-On is leveraged wherever possible to increase security and convenience.</li> </ul>
Services are delivered and asset components are maintained in compliance with Federal laws and regulations.	ITAG 1 – P ITAG 3 – S	<ul style="list-style-type: none"> <li>• Automated tools are used to track and confirm compliance between deployed software and software licenses.</li> <li>• Implement Desired Configuration Manager (DCM) to validate personal computing devices are delivered and maintained in USGCB configuration.</li> <li>• Smart Card/PIV access (ICAM) – enabling two form factor access</li> </ul>
Processes and practices aligned with industry practices to deliver secure, reliable services with the least total cost of ownership.	ITAG 4 – P ITAG 2 – S ITAG 3 – S	<ul style="list-style-type: none"> <li>• Desktop hardware and software refreshes are sufficient to meet reliability and security objectives while optimizing the total cost of ownership, using concentrated whole-replacement efforts (forklift) as opposed to annually metered replacements.</li> <li>• New investments are shown to remain within established budgets and contribute to reducing the total cost of operations.</li> <li>• Lifecycle planning and forecasting are applied to all of the asset categories.</li> <li>• Leverage RFID to enable cost effective tracking and inventory management of office automation hardware assets.</li> <li>• Implement disaster recovery and COOP capabilities for office automation services to include personal computing capabilities.</li> </ul>

**Table 3.1: Office Automation Portfolio Objectives**

<sup>20</sup> Each objective relates to a single primary goal indicated by “P”; objectives may also relate to secondary goal(s), indicated by “S”.





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**FY 2014 BPA IT Asset Strategy Plan****3.2 Asset Current State**

The Office Automation Portfolio maintains 5,400 personal computing devices to support approximately 4,415 staff members. Through the introduction of standards and refreshing heterogeneous and poorly performing systems, IT has been able to control and reduce the overall cost of office automation operations from FY2005 to the present. In addition, IT has completed deploying a virtual desktop infrastructure (VDI) with an initial 34% penetration of thin clients. The initial deployment of thin clients has taken longer than projected in the FY2012 Asset Strategy. Consequently, we have are just beginning to receive the benefits from implementing a VDI environment. These benefits include tangible and intangible benefits. The intangible benefits include increased end user satisfaction from faster connection time (less than 20 seconds), being able to connect any device, anywhere, anytime to our virtual desktops (enabling secure and reliable telework and the use of personally owned devices to connect remotely), and the ability to reconnect saved sessions to another device. The tangible benefits include reduced maintenance cost from failing devices (thin clients have a lower failure rate than traditional personal computing devices, and have a lower unit cost and longer life expectancy), lower energy usage, and require lower desk-side support. Additional tangible benefits will be a major reduction in the cost of upgrading operating systems, office suite, and removing 34-50% of our personal computing devices (our thin clients) from our next scheduled forklift refresh in FY2018/FY2019. (It should be noted that as a direct result of the delay in desktop refresh and subsequent removal of our aging personal computing fleet, we have experience a high rate of hardware failure in FY2012 and FY2013, which has kept office automation maintenance from dropping as we transition to thin clients and new laptops and desktops.)

**Virtual Desktop Environment**

The VDI rollout fell behind the FY2012 Asset Strategy projection due to a number of reasons which include:

- The sheer number of diverse desktop titles that needed to be analyzed prior to converting users to thin clients (not all titles are suited for a VDI environment)
- Time to convert major titles to enable application streaming to desktops (both virtual and traditional desktops)
- Validating scalability and reliability of VDI architecture/environment prior to moving a large portion of staff to virtual desktops
- Creating a USGCB baseline
- Enabling the OMB mandated smart card for 2-form factor network logins for virtual desktops for both network users and remote users

Leveraging technology and our VDI will enable enhanced control and management of desktop titles, reducing complexity and helping to lower ongoing operations costs. The VDI environment will also reduce the cost of deploying software upgrades (including office suite and operating systems) and future forklifts.

Our VDI environment can also be characterized as a major step towards transitioning to Desktop as a Service (DaaS).

Completion of the transition to our VDI has also resulted in moving the desktop environment from Microsoft Windows XP to Microsoft Windows 7, along with specific fixed and mobile computing device upgrades where applicable, using USGCB-compliant configurations. We will also enable and transition to using 2-form factor network login using the OMB issued

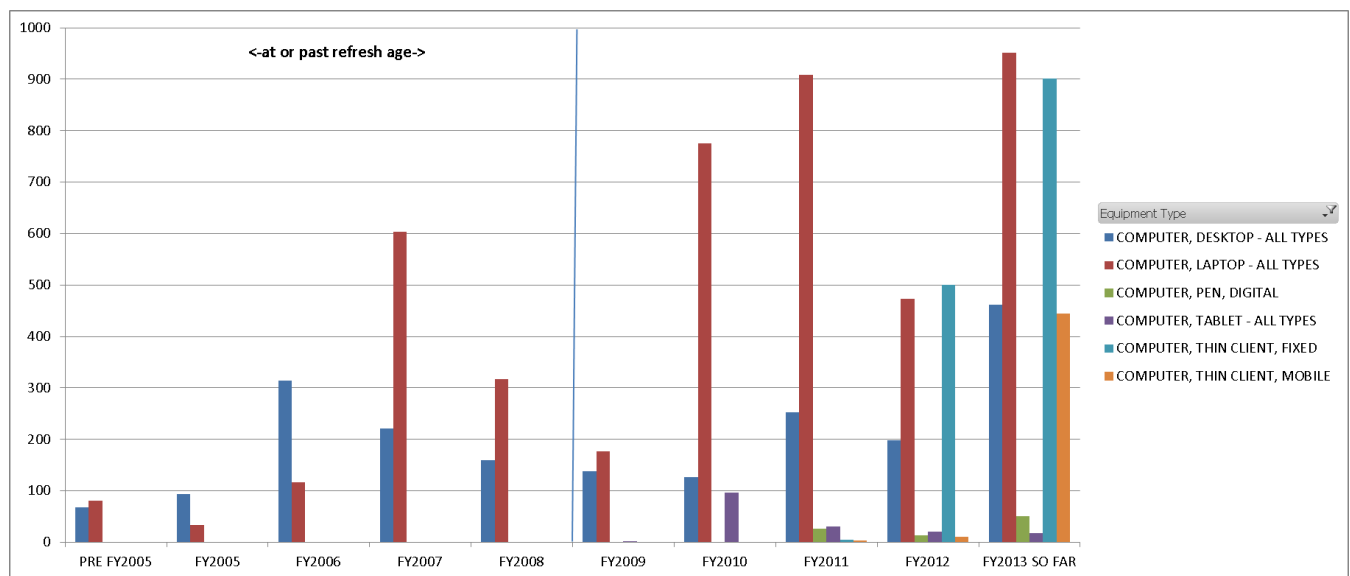


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Smart Card, allowing us to comply with Home Security Presidential Directive-12 and OMB directives.

Figure 3.1 shows the age distribution of BPA's workstation systems. As can be seen from these figures, we have refreshed our fleet of aging personal computing devices (in FY2012 47% of the laptops were past the industry best practice refresh cycle age and 58% of workstations were past their refresh age) and prepared us to continue with our forklift approach with the next refresh scheduled for FY2018. The adoption of this approach requires us to maintain the discipline to program and execute a forklift every five years. Failure to fund and execute on the forklift will result in a rapid increase in maintenance costs in the out-years as laptop and traditional desktop unit failures begin to increase. As a result of completing our first forklift, we anticipate a sufficient drop in desktop and laptop failures through FY2016/FY2017 with an increase in the failure rate in year 4 and 5 (FY2018/FY2019). We have programmed the funding levels for personal computing device replacements to reflect first the significant drop resulting from the completion of the forklift and then a small rise to enable replacement of personal computing devices as the failure rate increases with the age of the fleet.



**Figure 3.1: Number of Personal Compute Devices by Year Procured**

An additional benefit we are anticipating from completing our first forklift, with the creation of a VDI environment, is the rationalization of desktop software titles and better control over our annual Microsoft Enterprise Agreement desktop software true up. Figure 3.2 shows the growth in our Enterprise Agreement costs. In FY2010, a concerted effort was made to identify and reduce the number of Microsoft licenses back to the last baseline. As can be seen in Figure 3.2, this effort was successful but it was a resource intensive manual effort. Going forward we should be able to establish and maintain the same tight level of controls through leveraging automation instead of intensive manual labor. We should also have a tighter control on the number of primary personal computing devices we are maintaining. In FY2016 we will be renewing our Enterprise Agreement, which will allow us to re-baseline with a lower number of



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primary personal computing devices/users, transitioning from a per-device to a per-user based licensing. Our expectation is that our desktop Microsoft License costs will both drop and be contained in the future, barring an unforeseen large increase in BPA staffing levels (such an event would impact both software and hardware costs). Also note an artificial drop in cost in FY13. This was caused by a change in payment policy, moving from annual payments to monthly payments, which shifted the time at which accumulated charges are aggregated. Simply stated, the FY13 costs only account for nine months of the year.

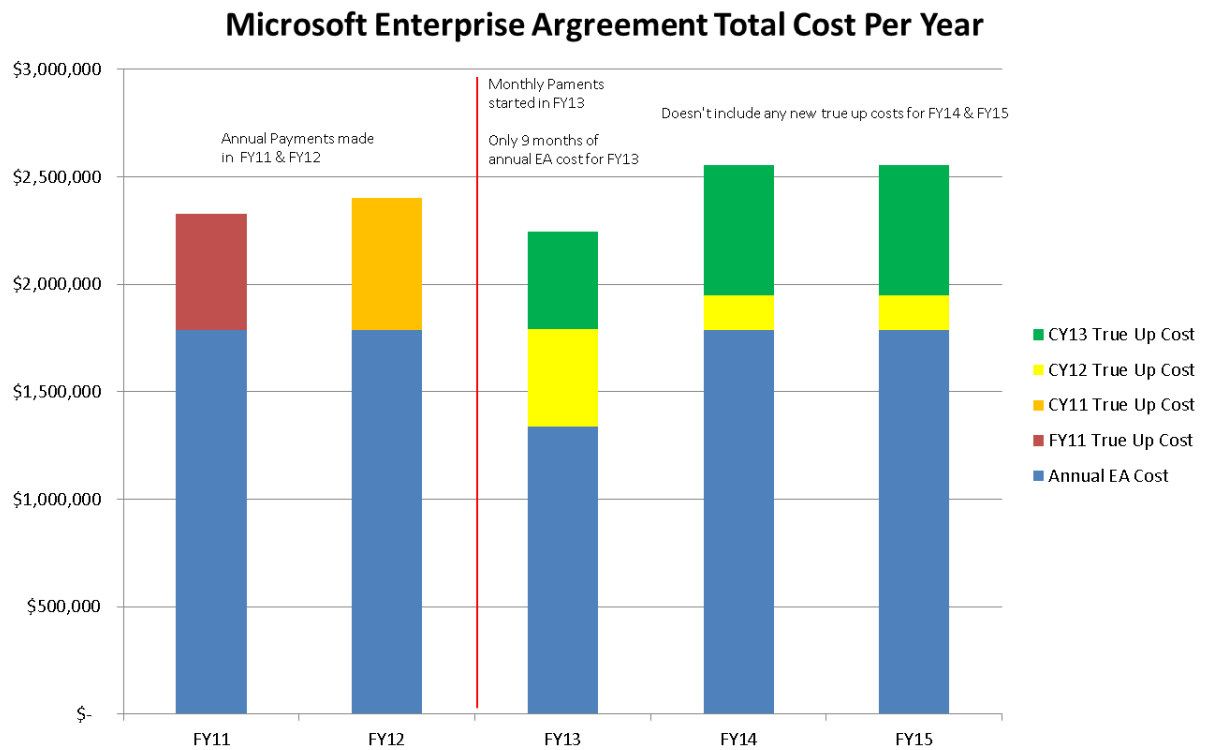
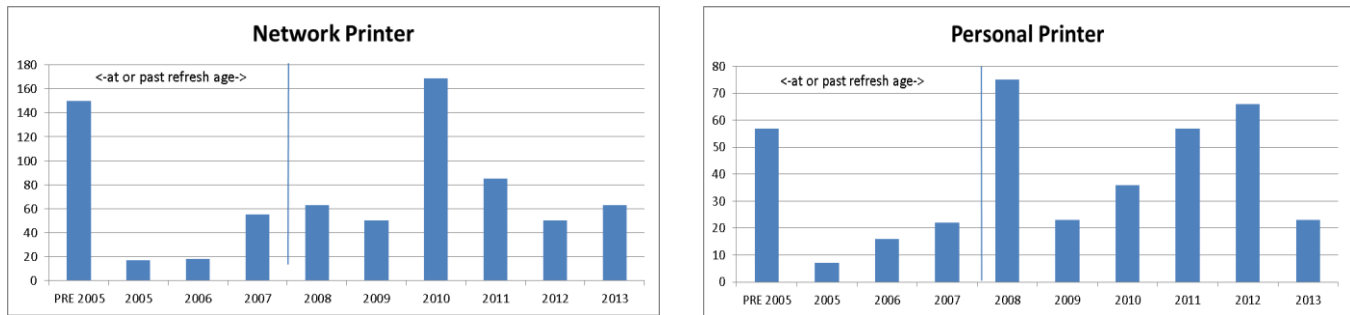
**Figure 3.2: Annual Enterprise Agreement True-Up Costs**

Figure 3.3 shows the age distribution of the BPA's fleet of printers. One third of the total are in their eighth year or more of service, needing more frequent repair with parts that are increasingly hard to find, and using ink technologies that become more expensive to provide with age. This pushes the total cost of ownership higher. A large number of these printers are personal printers, which have been put into service to meet a combination of needs, which include confidentiality (to protect sensitive contracting and personnel information) and convenience. Personal printers also have higher ink/toner cost per page than network printers, typically costing 9 times per page more than network printers.



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**FY 2014 BPA IT Asset Strategy Plan****Figure 3.3: Number of Printers by Year Procured**

As we finish our first personal computing forklift, we will focus resources to address our aging fleet of printers to ensure we provide reliability of print services, enhance print service security, improve quality of print services, introduction of new capabilities (e.g. follow me printing, etc.), reduced operation cost (e.g. reduced repair costs, reduced toner costs). To improve our printing services we will begin implementing an initiative we are labeling Print Smart that includes hybrid-managed network printing services to begin in FY2014, with completion in FY2015. Under this approach, the managed service provider would provide hardware, service, and consumables while BPA would perform user support and printer placement/consolidation. The benefits we are expecting to achieve include an overall reduction in printer service costs between 10% and 30%.

**Print Smart Initiative Highlights**

- Refresh aging fleet of printers & copiers with high speed multifunctional printer/copier/scanners to reduce number of deployed devices
- Implement password enabled printing to
  - Protect sensitive information
  - Reduce abandoned printouts (~9% of printed pages)
  - Eliminate desktop printers
- Reduce cost of printing services by 10-30%




An initiative to contain operating costs and improve end client experience was the ongoing adoption of a maturity model and moving up the maturity ladder. This initiative to improve Operational Excellence began in 2010 and produced results, albeit slower than we anticipated. To date in the Office Automation area, we have moved from the basic to standardized level for the following capabilities: Change & Configuration Management, Incident Management, Problem Management, and System Monitoring. Although the initiative has host impetus and expansion is currently on hold, we expect to continue to improve in these four specific areas, moving from the Standard to the Rationalized level of the maturity framework by FY2017. Complexity and processes are two main drivers in the size of IT functions<sup>21</sup>. Our VDI environment has helped us address the complexity of our technical environment, and the adoption of a maturity model has helped us address the complexity of specific processes. Both efforts together are intended to help both improve services and contain costs.

<sup>21</sup> Cecere, Marc, "What Drives The Size of IT Functions", Forrester, 6 August 2013.



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<b>Office Automation Objectives</b>	<b>Status Meeting Objectives</b>	<b>Comments</b>
Leverage technology to provide superior services to end user.		<ul style="list-style-type: none"> <li>• SCCM/MDT effort has started to automate OS and layered product delivery, although the delay of Windows 7 roll-out has also slowed this effort.</li> <li>• The upgrade from Windows XP to Windows 7 and Office 2010 tools are continuing, resulting in more optimal configurations, maintainability, and support for mobile computing.</li> <li>• The VDI implementation is achieving efficiencies detailed above.</li> <li>• Sequencing applications to provide them in a virtual manner has begun, but has proven more difficult than expected.</li> <li>• Remote access to the VDI has improved disaster response and telework capabilities.</li> </ul>
Services are delivered and asset components maintained in compliance with Federal laws and regulations.		<ul style="list-style-type: none"> <li>• USGCB compliance is built in to Windows 7 desktop images and group policies.</li> <li>• Asset management components of SCCM, SCCM Expert, and process engineering are taking place to assure compliance with software licensing.</li> <li>• Ability to use PIV/Smart Card/ICAM – 2 form factor authentication is evolving.</li> </ul>
Process and practices aligned with industry practices to deliver secure, reliable services with the least total cost of ownership.		<ul style="list-style-type: none"> <li>• Have moved from basic to standard for four key capabilities: Change &amp; Configuration Management, Incident Management, Problem Management, and System Monitoring. Completion of the transition from the standard to the rationalized level has been targeted for FY2017.</li> <li>• Have implemented remote assistance to improve first call resolution.</li> <li>• Established and maintaining a knowledge library to reduce problem resolution time.</li> </ul>

**Table 3.2: Status of Office Automation Portfolio in Meeting Objectives<sup>22</sup>**

<sup>22</sup> Upward arrow indicates that the status trend is improving (e.g. red upward arrow indicates that the status is trending towards yellow), horizontal indicates no change in the trend line, and a downward arrow indicates the status is trending downward (e.g. green downward arrow indicates status is heading towards yellow)



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**FY 2014 BPA IT Asset Strategy Plan****3.3 Risks**

ID	Risk		Mitigation
	Likelihood	Impact <sup>23</sup>	
OA1	Failure to refresh personal computing devices consistent with industry refresh schedules – resulting in desktop hardware (systems and/or components) failing at an unacceptable rate (driving expenses costs up and causing user disruptions).		<ul style="list-style-type: none"> <li>• Due to VDI thin client adoption, this is only an issue for 1/3 of personal computing fleet</li> <li>• Increase penetration of thin client</li> <li>• Monitor failure rates and maintain sufficient spares to keep systems running.</li> <li>• Establish Service Level Agreements with Supply Chain on procuring units and bench stock parts.</li> <li>• Establish bench stock levels with monitoring of levels and thresholds for replenishing levels.</li> <li>• Move to concerted forklift method of system refreshes to correct MTBF trends.</li> <li>• Program funds to accommodate refresh aligned with forklift</li> <li>• Shift to virtual computing environments where fit and function align.</li> </ul>
	Likely	Minor (\$100K - \$1M)	
OA2	Failure to receive sufficient time to program and to plan for support for arrival of new employees and contractors (impacts desktop system reserves and support levels).		<ul style="list-style-type: none"> <li>• Establish Service Level Agreements with Supply Chain for projecting influx of additional contractors.</li> <li>• Leverage HRmis system and Service Connection to project influx of new hires.</li> <li>• Work with HR to develop projection of future years staffing levels.</li> <li>• Utilize VDI to provide compute resources, as provisioning can be very fast.</li> <li>• Work with Strategic Planning and business units to understand equipment and staff requirements to support major initiatives.</li> <li>• Work with CFO to develop funding of desktop systems, network printers, and desk side support staff to support new initiatives.</li> </ul>
	Almost Certain	Insignificant (<\$100K; would require 50+ incidents/year to move to Minor)	
OA3	Failure to maintain accurate inventory and deployment information for hardware and software assets.		<ul style="list-style-type: none"> <li>• Identify and implement automated management software tools to track software titles and software usage, and deployed hardware.</li> <li>• Review and improve current process for tracking hardware assets; investigate RFID tagging and other automated methods.</li> <li>• Work with IT Program Office to validate and refresh current license base.</li> <li>• Prepare and deliver clear and concise direction to all staff describing these roles and responsibilities. Collect signed memo of understanding from staff members.</li> <li>• Place accountability and consequence language into the BPAM and performance plans.</li> </ul>
	Almost Certain	Minor (\$100K-\$1M)	
OA4	Failure to base cost justification for software based on utilization/benefit of deployed software.		<ul style="list-style-type: none"> <li>• Review and improve current process for reclaiming software licenses.</li> <li>• Utilize management software tools provided by DMP to identify and meter all software titles.</li> <li>• Develop a methodology for renting software and role-base provisioning.</li> </ul>
	Almost Certain	Minor (\$100K - \$1M)	
OA5	Failure to close disconnect with business users on IT resources and planning to meet future office automation needs.		<ul style="list-style-type: none"> <li>• Mature Asset Plans</li> <li>• Work with business clients to close disconnect</li> </ul>
	Almost Certain	Minor (\$100K - \$1M)	

<sup>23</sup> Agency-Level Consequence Scale



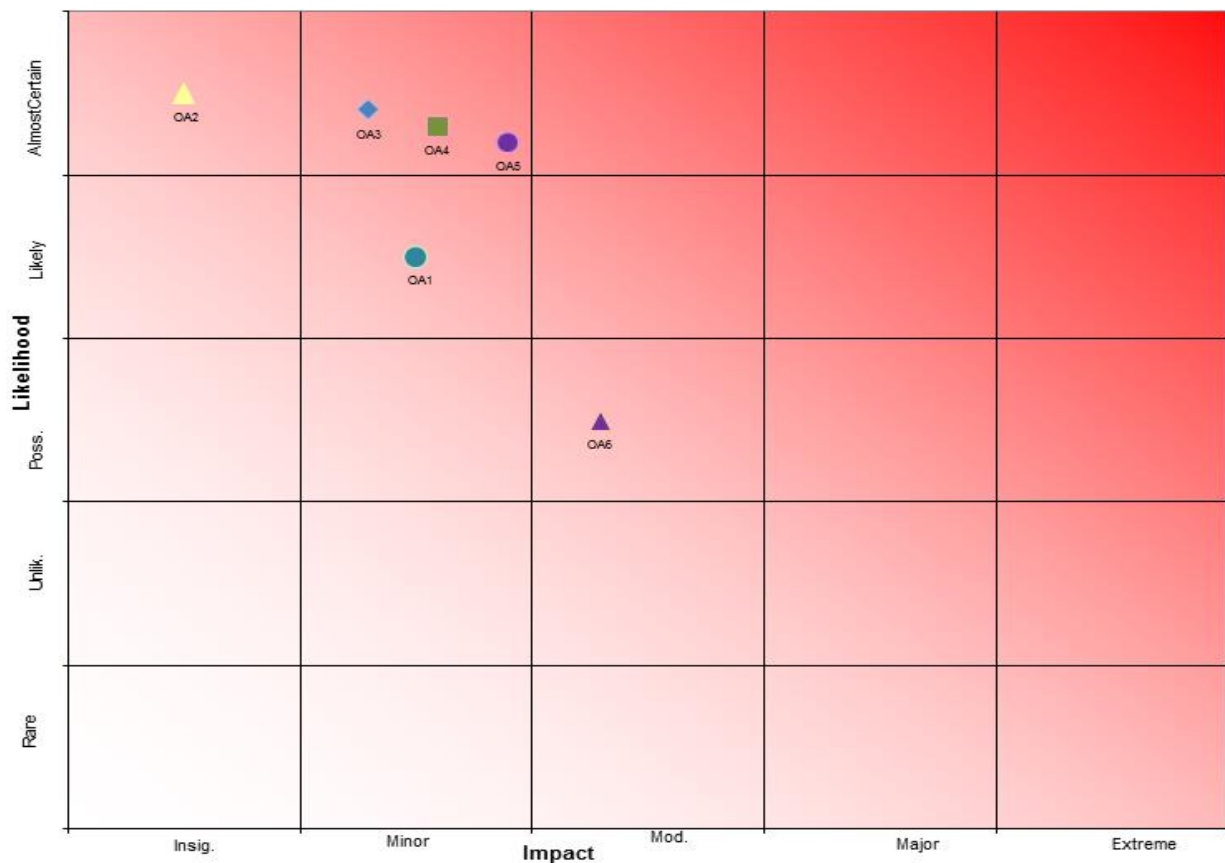
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ID	Risk		Mitigation
	Likelihood	Impact <sup>24</sup>	
OA6	Failure to plan and budget for increased demand for Workplace of the Future (including increased remote access capability, and consumerization of IT products).		<ul style="list-style-type: none"> <li>Continue to research and mature remote connection technologies through DMP to enable safe use of personally owned devices for remote access.</li> <li>Evaluate and update BPA policies on use of personally owned devices to leverage emerging technologies.</li> <li>Evaluate and standardize on tablet devices.</li> </ul>
	Possible	Moderate (\$1M - \$10M)	

**Table 3.3: Office Automation Portfolio Risks**

It should be noted that for OA2 (unplanned new staff) each event is small when using the agency's impact categorization, taking 50 unplanned events to move from insignificant to minor. However, these events have a large impact on the Office Automation resources. The impact is not limited to hardware and software costs, the latter being the driver in Microsoft true-up costs, but also includes ongoing client side support labor. As the number of unplanned staff additions grows, the ratio of clients to support personnel reaches the point where additional support staff is needed to maintain the quality of service.

**Figure 3.5: Office Automation Risk Map**

<sup>24</sup> Agency-Level Consequence Scale



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**FY 2014 BPA IT Asset Strategy Plan****3.4 Strategies**

We have already discussed a number of evolving strategies IT is implementing in order to ensure reliable and secure desktop services and meet evolving and emerging requirements while striving to provide these services and maintain office automation assets at the least total cost of ownership. Here we summarize IT strategies, to include benefits, challenges, and outlook. These strategies are then linked back to the portfolio's objectives in Table 3.5.

<b>Portfolio Strategy</b>	<b>Benefits</b>	<b>Challenges/Issues</b>	<b>Asset Portfolio Outlook</b>
<b>Device Standardization:</b> <ul style="list-style-type: none"> <li>• Standard laptop</li> <li>• Standard desktop</li> <li>• LiDAR workstation</li> <li>• Field user – rugged laptops</li> <li>• Thin clients</li> <li>• Mobile thin clients</li> <li>• Mobile device management tool</li> </ul>	<ul style="list-style-type: none"> <li>• Provides devices that meet business requirements. Power of current standard workstation and laptops makes exceptions rare.</li> <li>• Reduces cost of developing and maintaining Federal Desktop Core Configuration images.</li> <li>• Aids in controlling costs.</li> <li>• Improves operational reliability.</li> </ul>	<ul style="list-style-type: none"> <li>• Advances in technology allows reducing the number of device standards (e.g. today's standard workstation is more powerful than previous advanced workstation allowing for one standard for workstations)</li> <li>• Initial (pre deployment) of thin clients have encountered pockets of resistance and skepticism associate with changing personal computing devices.</li> </ul>	<ul style="list-style-type: none"> <li>• Continue to use strategy to control costs.</li> <li>• Reduce number of standards as technology advances.</li> <li>• Align device standards with evolving and emerging staff roles.</li> <li>• Already achieving increased client satisfaction from capabilities and performance of thin clients.</li> <li>• Finished implementing phase 1 of thin client with 50% penetration will increase thin client usage in out years.</li> </ul>
<b>Maintain 5-year refresh cycle on desktop systems for traditional workstations and laptops with scheduled forklift refresh.</b>	<ul style="list-style-type: none"> <li>• Extends investment in desktop system with minimum disruption to user.</li> <li>• Aligns refresh cycle with deploying new operating system and office productivity suite – minimizing disruption to end users while reducing total cost of ownership.</li> <li>• Avoids cost associated with current industry recommendation to re-image a system within five years due to cumulative operating system errors</li> <li>• Achieves improved prices on commodity devices.</li> <li>• Provides increased uniformity in devices reducing image management issues (and costs).</li> </ul>	<ul style="list-style-type: none"> <li>• Extends refresh beyond industry best practices.</li> <li>• Requires managing and staffing surge capability to prepare and execute on receiving, distributing, and removing equipment.</li> <li>• Requires budgetary discipline to program and justify repeating 5 year increase in expense budget to execute.</li> <li>• Requires aligning operating system and office suite upgrades/feature packs with laptop and desktop pc to reduce total cost of ownership</li> </ul>	<ul style="list-style-type: none"> <li>• Adopt and maintain 5 year refresh to optimize total cost of ownership.</li> <li>• (N.B. Thin clients have a longer 7-10 year refresh cycle which will reduce total cost of ownership over traditional fleet of laptop and desktop pc)</li> <li>• Transition from planned annual refreshes to “forklift” to align desktop refreshes with new operating systems and office productivity suites to minimize disruption to end users and to achieve least total cost of ownership.</li> </ul>



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<b>Portfolio Strategy</b>	<b>Benefits</b>	<b>Challenges/Issues</b>	<b>Asset Portfolio Outlook</b>
<b>Virtual Desktop Infrastructure:</b> <ul style="list-style-type: none"> <li>• Thin clients</li> <li>• Application streaming</li> <li>• Remote Access</li> </ul>	<ul style="list-style-type: none"> <li>• Moves computational power of workstations into datacenter allowing for improved management and security with reduced labor costs.</li> <li>• Enables application streaming</li> <li>• Desktop units have 7-10 year lifecycle with lower desktop refresh costs and reduced disruption to end user.</li> <li>• Supports sustainability, Workplace of the Future, and eDiscovery initiatives</li> <li>• Enables telework – any device, anytime, anywhere</li> <li>• Enables secure BYOD</li> <li>• Overall improved security from central administration</li> </ul>	<ul style="list-style-type: none"> <li>• Thin client devices must be aligned with users' functional needs (e.g. field user requiring a rugged device would not be a candidate for thin client while most knowledge workers would be candidates).</li> <li>• Unclear if performance will be adequate for field office users and will need to be tested.</li> <li>• Some clients hesitate/ resistant to replace traditional computing devices with thin client</li> <li>• Packaging applications for streaming has proven demanding.</li> </ul>	<ul style="list-style-type: none"> <li>• Have achieved initial target of 50% thin clients and expect to expand usage in out-years</li> <li>• Client satisfaction with using VDI environment for remote access is extremely high.</li> <li>• Application streaming is improving application deployments.</li> <li>• Application streaming will enable user self-service for application provisioning.</li> <li>• Application streaming will mitigate cost and client disruption from operating system and office suite upgrades</li> </ul>
<b>Automation:</b> Leverage tools for provisioning new equipment, improving patch management, delivering applications, and monitoring & repairing system/application errors.	<ul style="list-style-type: none"> <li>• Improves operational reliability through providing consistency of actions and outcomes.</li> <li>• Reduces time to provision and deliver operational devices.</li> <li>• Ensures devices are delivered and maintained at known secured baselines.</li> <li>• Ensures speedy response to system and device failures, reducing time for return to operation.</li> <li>• Reduce cost and faster implementation of security and operational patches.</li> </ul>	<ul style="list-style-type: none"> <li>• Requires labor investment in setting up and configuring tools.</li> <li>• Monitoring tools need to be tuned to reduce the number of false positive alerts.</li> </ul>	<ul style="list-style-type: none"> <li>• Slow implementation of management tools; however, deployment of myPC (BPA implementation of VDI) is helping to accelerate deployment and adoption of management tools.</li> <li>• Use management and monitoring tools to ensure operational reliability and to reduce operations costs.</li> <li>• Use of patch management tools will improve security while reducing cost of deploying critical patches.</li> </ul>
<b>License Tracking/Usage Monitoring</b>	<ul style="list-style-type: none"> <li>• Enables identification and removal of unlicensed software.</li> <li>• Allows BPA to repurpose underutilized licenses to reduce and control software license costs.</li> <li>• Facilitates budget formulation for software licenses.</li> <li>• Ensures license compliance.</li> </ul>	<ul style="list-style-type: none"> <li>• Initial deployment may identify software licenses that either need to be removed or procured – may be substantial costs to true up licenses.</li> <li>• Constrained IT staff time will be needed to implement, tune, and manage monitoring tools and to create reports.</li> </ul>	<ul style="list-style-type: none"> <li>• Use tracking and monitoring tools to manage licenses to reduce and control software license costs.</li> <li>• Automated provisioning supports reclaiming under used licenses and re-provisioning.</li> </ul>

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<b>Portfolio Strategy</b>	<b>Benefits</b>	<b>Challenges/Issues</b>	<b>Asset Portfolio Outlook</b>
Application Self Service: Ties automation and license tracking to enable users to download select titles on demand.	<ul style="list-style-type: none"> <li>Enables clients to request and download commonly used software titles through a web interface – reducing time and red tape to provision software title.</li> <li>Reduced administration costs.</li> <li>Improved client satisfaction.</li> </ul>	<ul style="list-style-type: none"> <li>Strong dependency on license tracking and monitoring tools to be in place prior to implementing.</li> </ul>	<ul style="list-style-type: none"> <li>Implement capabilities by Q4 FY2014.</li> <li>Implement policies and accomplish organizational change management by Q2 FY2015.</li> </ul>
Password Self Service (enabling network users to reset forgotten or temporary passwords)	<ul style="list-style-type: none"> <li>Reduces client support costs by enabling network users to reset forgotten passwords using security challenges (question and answer).</li> <li>Support federal directive to use smartcards by enabling users to set temporary if Smart Card is left at home.</li> </ul>	<ul style="list-style-type: none"> <li>Organizational change management to ensure both adoption of smart card and embracing self service capabilities.</li> </ul>	<ul style="list-style-type: none"> <li>Establish self-service password services by Q2 FY2014.</li> </ul>
Process Maturity: Transition from Basic maturity level to Standard and then to Rationalized level.	<ul style="list-style-type: none"> <li>Improves quality of service to end users, reducing time to repair systems or deliver new software.</li> <li>Supports Operational Excellence through implementing efficiencies and creating culture of continuous improvement.</li> </ul>	<ul style="list-style-type: none"> <li>IT staff currently heavily engaged in key programs (e.g. TPIP, REV) and projects (e.g. Windows 7 upgrade) and feel stressed to find time for process improvements.</li> <li>Some IT staff concerned that finding efficiencies may translate into lower staffing levels.</li> </ul>	<ul style="list-style-type: none"> <li>Adoption of has been slower than anticipated. Deployment of myPC has forced re-evaluation of timelines in moving up the maturity model.</li> </ul>
Network Printers Refresh <ul style="list-style-type: none"> <li>Transition to managed printer.</li> <li>Pilot and transition for multifunction printers (MFP) wherever possible.</li> </ul>	<ul style="list-style-type: none"> <li>Optimizes total cost of ownership: As printer models age, the cost of toner increases. For printers that are 5 years old, the cost per unit of toner can be twice the first year's cost ( cost per unit may continue to rise to 4 times first years cost over life of printer).</li> <li>Reduces time to repair printer issues.</li> <li>Provides insight to cost of printing operations.</li> <li>MFP consolidates devices to reduce energy consumption, reduce consumable costs, speed replacements, and streamline support.</li> <li>Follow-me printing will reduce consumption of consumables.</li> </ul>	<ul style="list-style-type: none"> <li>The temptation and current practice is to continue to use printers past their refresh date. This increases toner cost and can cause print driver issues when upgrading to new operating systems.</li> <li>Organizational change management: Staff often considers shared printers as “theirs”, and attempts to remove or consolidate printers to achieve efficiencies are often met with end user resistance and complaints.</li> </ul>	<ul style="list-style-type: none"> <li>Printers are becoming more efficient and evolving to allow multi-function capabilities (scanning, copying, etc). Security issues with multifunction devices are becoming better understood and manageable. Outlook is good to consolidate and leverage these devices (along with employing network monitoring tools) to achieve efficiencies while improving overall BPA network printing capabilities.</li> </ul>



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<b>Portfolio Strategy</b>	<b>Benefits</b>	<b>Challenges/Issues</b>	<b>Asset Portfolio Outlook</b>
Cloud-based Services Investigate services for form, fit, function, and security.	<ul style="list-style-type: none"> <li>• May support least total cost of ownership for specific services (e.g. mobile device management)</li> </ul>	<ul style="list-style-type: none"> <li>• Must validate cloud based solutions are both cost effective and secure.</li> </ul>	<ul style="list-style-type: none"> <li>• Explore cloud maturity and associated organizational change management issues in FY2014.</li> </ul>

**Table 3.4: Summary of Office Automation Strategies****3.5 Asset Portfolio Outcomes**

The current status of the Office Automation Portfolio objectives is discussed in detail below.

<b>Office Automation Objectives</b>	<b>Supporting Portfolio Strategy</b>	<b>Asset Portfolio Measures</b>
Leverage technology to provide superior services to end user.	<ul style="list-style-type: none"> <li>• Device Standardization</li> <li>• Virtual Desktop Infrastructure.</li> <li>• Self Service.</li> <li>• Managed Print Services.</li> <li>• Mobile Device Management</li> <li>• Cloud Services</li> </ul>	<ul style="list-style-type: none"> <li>• Provision a minimum of 50% client systems with thin clients by 1st quarter FY2013.</li> <li>• Increase thin client penetration to 65% by Q4 FY2017</li> <li>• Enable BYOD by Q4 FY2015</li> <li>•</li> </ul>
Services are delivered and asset components maintained in compliance with Federal laws and regulations.	<ul style="list-style-type: none"> <li>• Virtual Desktop Infrastructure.</li> <li>• Improved Remote Access.</li> <li>• Automation.</li> <li>• License Tracking.</li> <li>• Storage.</li> </ul>	<ul style="list-style-type: none"> <li>• All personal computing devices are deployed and maintained in a certified USGCB image: <ul style="list-style-type: none"> <li>○ 60% of all client systems are running USGCB certified system by 1<sup>st</sup> quarter FY2014.</li> <li>○ 100% of all client systems are running USGCB certified system by 3<sup>rd</sup> quarter FY2014.</li> </ul> </li> <li>• All network users use Smart Cards for logic network access by Q3 FY2014.</li> </ul>
Processes and practices aligned with industry practices to deliver secure, reliable services with the least total cost of ownership.	<ul style="list-style-type: none"> <li>• 5 Year refresh cycle.</li> <li>• Forklift Refresh.</li> <li>• Device Ratio.</li> <li>• Automation.</li> <li>• License Tracking.</li> <li>• Process Maturity.</li> </ul>	<ul style="list-style-type: none"> <li>• Transition key processes (Change &amp; Configuration Management, Incident Management, Problem Management, and System Monitoring) from Basic to Standard level of the maturity framework by 2<sup>nd</sup> quarter FY2015.</li> <li>• Transition key processes (Change &amp; Configuration Management, Incident Management, Problem Management, and System Monitoring) from Standard to Rationalized level of the MOF maturity framework by 2<sup>nd</sup> quarter FY2017.</li> <li>• Control expense budget to below EOY2014 plus inflation through FY2018. (N.B. This portfolio is expected to pick up new costs associated with cell phone program and toner costs, currently paid by facilities. These new charges are expected to be transferred to this portfolio in FY2014).</li> </ul>

**Table 3.5: Office Automation Portfolio Outcomes**

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**FY 2014 BPA IT Asset Strategy Plan****Support for Disaster Recovery**

The approach to disaster recovery (DR) prior to the implementation of our VDI environment has been to issue laptops. There have been several problems identified with this approach. The first is that not all staff members carry their laptops with them on a routine basis, including taking them home each night. This means that should an event occur, a sizable number of staff may not have access to their BPA-issued laptop. To compensate for this likely problem, we have housed laptops at our alternate site to enable provisioning of critical staff (i.e. schedulers, etc.). These devices need to be regularly patched and maintained if they are to remain viable, and this activity is typically overlooked as daily support takes precedence.

Another critical deficiency in our current Office Automation disaster recovery strategy is being able to handle a large ramp up in remote users should we lose critical datacenter components/resources in the Portland/Vancouver area.

Both of these deficiencies, maintaining spare laptops and accommodating remote access, will be mitigated by deploying a VDI at our alternate site. Should we suffer a major disruption in the Portland/Vancouver area, we can provide both virtual desktops and remote access from the alternate site. Virtual desktops are centrally managed, alleviating the patching and maintenance issues and can be accessed by any devices from anywhere, alleviating the issue of availability of BPA issued equipment during an emergency. The Desktop Disaster Recovery project is scheduled to deliver these capabilities by Q2 FY2014. These capabilities can also be leveraged in daily activities such as providing load balancing of services and/or load balancing of remote access for teleworkers during extreme weather events.





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**FY 2014 BPA IT Asset Strategy Plan****3.6 Future Initiatives**

Major Initiatives	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Sustain	Transition to Managed Print Services (Smart Printing)	Upgrade to IE11	Renew MS Enterprise Agreement	Recommendation on adopting Office 365	Refresh Forklift Laptops & Desktops	Refresh Forklift Laptops & Desktops		
	Upgrade to latest Office		Upgrade to current Win O/S IE browser Office suite and/or Office 365					
			Implement Mobile Device Management					
	Establish tablet and smart phone standards							
Compliance	Smart Cards used for logical network access							
Expand		BYOD fully supported by tools and policies		65% penetration of thin clients				
		Implement Software Self Service						

**Table 3.6: Office Automation Major Initiatives**

	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Labor	\$6.88M	\$7.02M	\$7.38M	\$7.66M	\$7.78M	\$7.91M	\$8.03M	\$8.16M
Materials	\$585K	\$510K	\$545K	\$645K	\$745K	\$1.45M	\$495K	\$545K
Contracts	\$4.74M	\$4.59M	\$4.76M	\$4.95M	\$5.03M	\$5.11M	\$5.19M	\$5.28M
Total Target	\$12.21M	\$12.12M	\$12.69M	\$13.26M	\$13.56M	\$14.46M	\$13.72M	\$13.98M
High	\$13.43M	\$13.33M	\$13.95M	\$14.58M	\$14.91M	\$15.90M	\$15.09M	\$15.37M
Low	\$11.60M	\$11.52M	\$12.05M	\$12.60M	\$12.88M	\$13.74M	\$13.03M	\$13.28M

**Table 3.7: Office Automation Portfolio Expense Requirements**

The Office Automation Portfolio has not identified any need for capital funds through FY2021. Individual items within this portfolio (e.g. cell phone, workstations, laptops, printers, etc.) fall below the threshold to qualify for capital funding.

Although the expense budget in the Office Automation portfolio is expected to grow at or below the rate of inflation, there are certain pressures to provide goods or services that could



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increase the rate of growth, depending on how they are addressed. These pressures include the consumerization of IT (adopting and managing tablet devices, smart phones, etc.) and refreshing printers. Additionally, if we experience a large and unanticipated increase in agency staffing, this will result in a corresponding increase in both hardware/software cost and ongoing Office Automation support labor costs.



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**FY 2014 BPA IT Asset Strategy Plan****4.0 Data Center Portfolio**

The Data Center Portfolio provides the computational resources (servers), Fiber Channel switches, data storage, and other infrastructure components necessary to operate the BPA's Critical Business Systems and Enterprise Systems (see chapter 5 for a discussion of these assets). The Data Center Portfolio contains assets that the typical end users seldom think about. However, this portfolio does contain services that are of interest to the most users, including email (includes controlling spam email) and file services.

**4.1 Goals & Objectives**

The following table shows the alignment of the Data Center services objectives with the general IT Asset Goals:

<b>Data Center Objectives</b>	<b>Aligns with Asset Goals</b>	<b>Outcomes</b>
Align resource utilization with industry practices while providing capacity to meet systems' current and projected average and peak resource requirements.	ITAG 2 – P <sup>25</sup> ITAG 3 - S	Capacity monitoring is used to achieve optimal resource balancing of key server and storage resources. Capacity planning is used to project future needs, acquiring and deploying additional resources prior to over-subscribing existing resources. Introduce multi-tiered to storage (high cost Tier 1 to low cost Tier 4) based on performance requirements to control costs. Develop a practice of resource allocation based on work-load profiles in order to control growth and cost of resources.
Proactively monitor data center resources and services.	ITAG 1 – P ITAG 2 - S	Monitoring tools are deployed, tuned, and scripted to automatically respond to threshold events, preventing disruption of production services. Information from monitoring tools is merged to enable event correlation, reducing time to restore services. Establish proactive monitoring tools' thresholds to enable staff to respond to negative trends prior to an event occurring.
Deliver secure, reliable, efficient, and predictable services through the effective use of management tools.	ITAG 1 – P ITAG 4 - S	Recurring tasks are automated using management tools, ensuring repeatable and consistent outcomes. Provisioning servers adheres to documented baselines. Increased server-to-server administrator ratios as staff time is freed from performing routine tasks through automation. Standardize and automate data restores and storage provisioning resulting in faster turnaround for requested services, reduced costs, and reliable services.

<sup>25</sup> Each objective relates to a single primary goal indicated by "P"; objectives may also relate to secondary goal, indicated by "S".



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<b>Data Center Objectives</b>	<b>Aligns with Asset Goals</b>	<b>Outcomes</b>
Leverage technology to achieve efficiencies.	ITAG 2 - P	<p>Utilizing the increased capabilities of new hardware, we have achieved a reduction from the FY2010 baseline of 1450 physical test and production servers to a level of 838 servers through consolidation and virtualization, and are now moving to achieve additional physical server reductions to enable the convergence of two data centers and reach a target of less than 400 physical servers by EOY 2016.<sup>26</sup></p> <p>The growth of new physical servers (and costs) is controlled through increased standardization, server virtualization, establishing server farms, and utilizing automated deployment.</p> <p>Data center energy consumption is reduced as a direct result of reducing the number of physical servers from the FY2010 levels.</p> <p>Optimize storage performance while reducing total cost of ownership through implementing tiered storage and workload-based resource management.</p> <p>Modernize backup technology to reduce backup windows and to improve recoverability capabilities to include introducing de-duplication and snapshots.</p> <p>Implement capacity planning to improve storage utilization and reduce storage costs.</p>
Achieve reliable and available services to support and meet BPA's Continuity of Operations Requirements (COOP).	ITAG 1 – P ITAG 3 – S	<p>Resources sufficiently redundant to meet Critical Business Systems failover requirements, moving from individual fail-over to bulk fail-over capabilities.</p> <p>Resources configured and maintained to meet systems Return to Operations requirements through establishment of basic resources at the Munro Scheduling Center to provide first-level fail-over of commercial business systems.</p> <p>Resources engineered and maintained to meet Critical Business Systems 99.9% <b>availability of services.</b></p> <p>Resources configured and maintained to meet Commercial and Enterprise 99.8% availability of services.</p> <p>Leverage replication capabilities in storage solutions and databases to protect structured and unstructured data to ensure Return To Operations (RTO) and Recovery Point Objectives (RPO) can be met, leveraging cloud offerings where appropriate.</p> <p>Establish a network operations center to enable monitoring and management of both datacenter and network services.</p> <p>Through a desktop disaster recovery project, establish capabilities covering both primary virtual desktop infrastructure and remote access.</p>

<sup>26</sup> The baseline is the number of servers needed to support the deployed systems as of FY2010. Projects delivering new system may require new servers and servers supporting disaster recovery will could impact reduction from the baseline.



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<b>Data Center Objectives</b>	<b>Aligns with Asset Goals</b>	<b>Outcomes</b>
Services are delivered and asset components maintained in compliance with Federal laws and regulations.	ITAG 1 –P ITAG 3 - S	Continuous monitoring tracks compliance with baselines and detects unauthorized changes from the baseline. Servers provisioned through the use of automated management tools to ensure each deployed server adheres to a documented baseline. All changes to server hardware and software configurations are performed following the documented change management process. Configuration tools are used to create audit trails on configuration changes. Design and implement all data/file transfers, monitoring and backup solutions operate in a High to Low Security domain to reduce risks and meet security objectives. Public Key Infrastructure (PKI) components are established and maintained to support smart card and electronic signature operations.
Processes and practices aligned with industry practices to deliver secure, reliable services with the least total cost of ownership.	ITAG 4 – P ITAG 2 – S ITAG 3 – S	Data Center hardware and software refreshes are sufficient to meet reliability and security objectives while optimizing the total cost of ownership. Costs of new investments balanced with operations and maintenance costs to achieve an optimized total cost of operations.

**Table 4.1: Data Center Portfolio Objectives****4.2 Asset Current State**

The major aspects of the Data Center Portfolio, described in detail below, can be summarized as:

- Identifying and documenting asset business objectives, and risks.
- Server refresh will be completing its first five-year forklift in FY2015. The forklift approach strives to reduce costs, assist in meeting business objectives, and to align efforts with migrating to new operating systems. Adopting energy efficient blade systems as part of this forklift will ease future forklift requirements as the blades can be refreshed within the same chassis.
- Executing on the Infrastructure Virtualization and Consolidation (IVC) project to achieve improved service delivery, adoption of best practices, improved resource utilization, and control future operating costs. The IVC will transition the data center and is pivotal for achieving major outcomes associated with the data center objectives, to include continued server consolidation, virtualization, and hierarchical, workload-based storage. This will also set the stage for consolidating the Ross and HQ data centers into one location.



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- Earlier attempts to adopt an ITIL<sup>27</sup> based operations maturity model to improve service delivery and reduce future operating costs by aligning people, processes, and technology with service delivery and operations has stagnated due to a lack of appetite and available personnel bandwidth to adequately address it. Although some progress was made with respect to process improvements, this effort is likely to remain dormant until more highly prioritized efforts are concluded.
- Management of electronic data continues to be an important issue. A recent refresh of the email system to include appropriate storage and retention of data has sparked new perspectives for storage that will lead to efforts to restructure data backup and recovery, seriously examine archiving practices, and shifting to workload-based storage solutions.
- The major software platforms supported within the data center will continue to be updated with a strategy that uses existing technical administrative staff to deploy new versions, while striving to limit costs through effective life cycle management. These include SQL, Oracle, SharePoint, Windows, and Exchange.
- Higher levels of effective security will be achieved through adoption of a Network Operations Center (NOC) to monitor and report on both data center and network resources, as well as establishment of separated production, test, build, and development environments through the IVC project to meet regulatory requirements for separation of duties and reduced insider threats.

The current status of the data center assets is discussed in detail below.

The Data Center Portfolio includes 838 servers to support development/testing, production and failover (Alternate Data Center) environments as of the beginning of FY2014. These servers are primarily located in Headquarters and at the Ross Complex. Servers are also located at the Alternate Data Center to provide COOP capabilities for the Critical Business Systems, and at several of the field sites. In FY2014, servers will also be deployed at the alternate scheduling center to support disaster recovery for certain non-critical systems, virtual desktop infrastructure, and remote access. Nineteen distinct Storage Area Network (SAN) systems are deployed to provide 1.2PB of storage capacity to these servers, of which 650TB hosts actual data. Eight of the nine legacy SAN systems will have their data migrated and be retired by the end of CY2014.

DCM successfully introduced server virtualization on a massive scale for Critical Business Systems, hosting between 8 – 20 virtual servers per physical server host, as well as Tripwire for configuration monitoring, and provisioning practices to speed up server deployment, improve consistency of build, and increase the number of servers managed per technician. We are continuing to execute on consolidation and virtualization of server resources by leveraging those same technologies and introducing blade servers to act as the hosts in the non-CBS environments. Although not all servers are candidates for virtualization and projects are delivering new requirements for servers, DCM and other efforts have reduced the number of physical servers by approximately 40% from the initial baseline. These servers will adhere to rigorous hardware standards and software baselines. At the same time, we examined a strategy for adopting appliances. Appliances are combinations of servers and storage optimized to

<sup>27</sup> ITIL, Information Technology Infrastructure Library, is a set of concepts and practices for [Information Technology Services Management \(ITSM\)](#), Information Technology (IT) development and IT operations.





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perform functions. The promise of appliances is lower total cost of ownership through a combination of optimized hardware and optimized management practices. We have adopted the Oracle Exadata appliance, but email and SQL evaluations revealed that workload-based units in farm configurations were a better fit.

While recent attempts to implement storage management tools have been marginally successful, progress has been made, and tools that were not satisfactory have been removed. It is still our intent to improve these tools in order to perform resource capacity planning to achieve higher efficiencies, optimized resource utilization, power reduction, automatic provisioning, and configuration management. Fortunately, other efforts such as the adoption of thin provisioning and de-duplication have enabled us to keep the growth of physical storage space capacity relatively flat at 10TB per month. However, these technologies will not hold the line much longer, and new approaches must be undertaken to manage not only the performance of the infrastructure related to demand, but to also manage the data itself through categorization, retention, and archival processes. All efforts will seek to optimize the cost per TB of storage while meeting specific performance requirements.

The past practice of completely centralizing storage and sharing it equally among all demands worked well at the time for the volume of data being created and/or consumed. However, the increased volume currently in place has driven an approach of isolating the various workloads demanding storage resources. It is not fiscally sustainable in the long run to simply add storage spindles in order to alleviate I/O performance issues or space capacity growth. The Oracle Exadata database appliance has been adopted to address Oracle resource requirements, email has been migrated to localized simple disks in a farm configuration, and SQL database demands are being evaluated with an eye to isolating those workloads with the use of Flash technologies. A key component for effectively identifying how best to approach specific workloads is a tool that can provide analytics for storage objects, allowing us to move data to less expensive solutions based on specific criteria such as frequency of access. This is expected to enable tiering the storage of data to match its needs, including the use of low-cost cloud storage. Total cost of ownership, network considerations, reliability and performance will lead to selection of an optimal solution for archiving. These various approaches are likely to present a challenge to our current data backup capabilities, which were based on practices viable several years ago, in spite of successfully mitigating the backup windows for a short period with faster tape libraries. We currently find that we retain approximately fifteen copies of all of our data at any given time, and current strategies available in the industry offer a much greater efficiency while meeting reliability requirements. Our responsible infrastructure organizations will address this issue in the near future.

On average Microsoft releases a major version upgrade to its server operating system approximately every three to five years. The last release was late calendar year 2012. Typically it takes time to understand the operational impact of a new operating system and then develop documented baselines for deploying the new operating system. We usually adopt a new operating system approximately 24-36 months after release; however, historically, due to the lack of a cohesive program to migrate to the new operating system and the time and costs involved across multiple organizations to test systems on the new operating system, we straddle multiple versions of an operating system for several years. This increases costs and



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reduces overall security as we must manage security patches and issues across multiple versions of an operating system. We have a similar situation with databases. At this point in time, we have major release of the server operating systems (Windows Server 2012), and the databases (Microsoft SQL 2012 and Oracle 12c) that we will need to deploy. We recently released Exchange 2010 and SharePoint 2010, but will be behind on those versions shortly.

As IVC continues to progress, it will deliver logically, and sometimes physically, separated environments for conducting production, test, build, and development activities. This will allow us to update our strategies to improve controls over these environments and meet Federal guidelines for separation of duties and protection of critical infrastructure. In a separate effort, a Network Operations Center (NOC) is being developed that will provide independent oversight of these new controls, as well as real-time identification and response to infrastructure weaknesses and/or failures.








The Data Center continues to represent a rich target for achieving greater efficiencies while improving service delivery and reducing out-year costs. This includes in-place improvements in efficiency for some systems, as well as moving to cloud-based solutions when system refreshes approach and total cost of ownership supports the transition (e.g. examining cloud solutions for hosting email, development activities, or external web services). The DCM project was initiated in FY2009 to take advantage of, and to realize, these efficiency opportunities specifically for CBS. Current expectation is the IVC will build on the success of CBS work to expand the efficiencies gained and apply them to the non-CBS environments by the end of FY2016. This should result in an alignment of people, processes and technology with service delivery and operations. This means ensuring we have processes in place to take advantage of the new capabilities being delivered through the project, both enhanced hardware capabilities and software management tools. The IVC project will also further develop the policies and practices needed to achieve efficiencies and ensure operational reliabilities. We also need to ensure our people understand how to take advantage of these capabilities and are following processes based on industry best practices to maximize the benefits from these new capabilities.

A summary of how the data center is currently meeting its objectives is presented in Table 4.2. The arrows follow the same convention as outlined for Table 3.2.



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<b>Data Center Objectives</b>	<b>Status Meeting Objectives</b>	<b>Comments</b>
Maximize resource utilization while providing capacity to meet systems' current and projected average and peak resource requirements.		<ul style="list-style-type: none"> <li>Collection of capacity data has improved with the advent of virtual environments.</li> <li>Server virtualization has increased physical hardware utilization.</li> <li>IVC project will recommend and implement additional automation for data collection, and methods to consolidate further.</li> <li>IVC has worked to develop storage needs and purchased the switching and storage devices to meet requirements and begin shifting to workload-based storage.</li> </ul>
Proactively monitor data center resources and services.		<ul style="list-style-type: none"> <li>Hardware resource monitoring is well established.</li> <li>Service monitoring is improving through leveraging existing technology and researching advanced tools and methods.</li> <li>Storage monitoring tools initially failed, but have been replaced and are progressing.</li> <li>Move from System Center 2007 to 2012 is experiencing slow adoption.</li> </ul>
Deliver secure, reliable, efficient, and predictable services through the effective use of management tools.		<ul style="list-style-type: none"> <li>Windows Sever 2008R2 baselines have been established.</li> <li>Simple use of imaging is currently employed, and more advanced automation for delivery of base images and layered applications has been started. <ul style="list-style-type: none"> <li>Automated deployment of the Operating System has been implemented in development using System Center Configuration Manager.</li> </ul> </li> </ul>
Leverage technology to achieve efficiencies.		<ul style="list-style-type: none"> <li>Use of Systems Center modules to manage the environment is slowly growing, and gaps are being filled by other products to manage patch delivery and application.</li> <li>The BITA has established standards placing a priority on virtualization and establishing virtual farms and limiting physical servers.</li> </ul>
Achieve reliable and available services to support and meet BPA's Continuity of Operations Requirements (COOP).		<ul style="list-style-type: none"> <li>Alternate Data Center is on-line for Critical Business Systems.</li> <li>Some redundancy has been achieved between HQ and Ross.</li> <li>Business Continuity efforts are continuing to identify the next level of business functions needing continuity support for their automation.</li> <li>Alternate Scheduling Center is being built to improve COOP/DR capabilities.</li> </ul>
Services are delivered and asset components maintained in compliance with Federal laws and regulations.		<ul style="list-style-type: none"> <li>NIST-based server baselines are being used for new builds, and USGCB compliance is built in to desktop images.</li> <li>Automated tools for monitoring and validating configuration baselines have been implemented.</li> <li>Automated patch management tools and processes are being improved to increase operational reliability and system security.</li> </ul>
Processes and practices aligned with industry practices to deliver secure, reliable services with the least TCO.		<ul style="list-style-type: none"> <li>Some base processes were improved through ITIL and MOF, but further progress is on hold.</li> </ul>

**Table 4.2: Status of Data Center Portfolio in Meeting Objectives**

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The Desktop Modernization Project (DMP), while primarily an Office Automation initiative to provide virtual desktops to employees and contractors, deployed an architecture consisting of blade servers and centralized storage to service approximately 2500 persons. Although DMP was responsible for the acquisition of these resources, their support and maintenance has fallen within the Data Center Portfolio and placed upward pressure on the number of physical servers. This is expected to occur again as the virtual desktop infrastructure is replicated into the Alternate Scheduling Center in order to provide COOP/DR services. Similarly, the federal telework initiatives may also require additional resources to support increased remote access from teleworkers.

A challenge that was facing the data center portfolio is the shift in the cost of servers. In prior years the individual cost of servers exceeded the threshold for capital expenditures. With advances in technology, the data center standard server fell below the capital threshold and would now be an expense cost. The advent of blade systems has reversed this trend, as the cost of individual blade servers to refresh the architecture remains above capital thresholds. The IPR budgets were built with the assumption that capital funds would be used to replace servers that failed between refresh cycles, and that will now continue.



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**FY 2014 BPA IT Asset Strategy Plan****4.3 Risks**

The Infrastructure Virtualization and Consolidation project (IVC) was designed specifically to address the known risks to the Data Center Portfolio. As this project progresses, all of the identified portfolio risks have been mitigated to acceptable levels. The following table describes those risks.

<b>ID</b>	<b>Risk</b>	<b>Mitigation</b>
	<b>Risks Mitigated to Acceptable Levels</b>	
DC1	Failure to deploy servers in documented security baselines to meet operations objectives.	Server operating system baselines have been established and automated deployment processes provision VMs with those baselines.
DC2	Failure to maintain server in documented security baselines to meet compliance requirements.	<ul style="list-style-type: none"> <li>• Tripwire and SCCM have been deployed to monitor compliance with baselines.</li> <li>• SCAP compliance monitoring is periodically conducted.</li> </ul>
DC3	Failure of Joint Telecommunication Service (JTS) Rooms to have adequate condition power and cooling to meet availability requirements.	Consolidate to JTS rooms being prepared by facilities to meet power and cooling requirements for high availability – part of Data Center Modernization Project.
DC4	Failure to implement capacity planning leading to either over-subscribing (degraded performance) or under-subscribing (idle servers).	VMware Capacity Planner has already been deployed and is collecting information for capacity planning. We need to incorporate that data into deployment strategies and overcome concepts of resource ownership. Elasticity of VMs allows resources to meet demands efficiently.
DC5	Failure to implement proactive monitoring to prevent service disruption.	IVC Project is implementing monitoring tools and processes to move IT from reactive to proactive monitoring.
DC6	Failure to adequately staff, with sufficiently trained personnel, to leverage monitoring and automated solutions.	Data Center Modernization Project will provide training and identify skill and staffing levels required to maintain capability but will not provide on-going staffing levels.

**Table 4.3: Data Center Portfolio Risks**

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**FY 2014 BPA IT Asset Strategy Plan****4.4 Strategies**

<b>Portfolio Strategy</b>	<b>Benefits</b>	<b>Challenges/Issues</b>	<b>Asset Portfolio Outlook</b>
Implement management tools to monitor and maintain data center assets.	<ul style="list-style-type: none"> <li>• Monitor health and status of hardware and services with alerting.</li> <li>• Enable capacity planning to optimize resource utilization.</li> <li>• Monitor configuration baselines to maintain operational reliability and security posture.</li> <li>• Long term, reduce cost of operations by transitioning from reactive to proactive maintenance.</li> </ul>	<ul style="list-style-type: none"> <li>• Tuning alerts to reduce false positives/chatter.</li> <li>• Developing corrective scripts to take proactive actions.</li> <li>• Instilling discipline and creating culture to embrace monitoring and proactive maintenance.</li> <li>• Establishing a monitoring team to leverage and manage capabilities.</li> </ul>	<p>Key element of the IVC Project is to extend monitoring of</p> <ul style="list-style-type: none"> <li>• Servers health</li> <li>• Configuration monitoring</li> <li>• Service performance</li> </ul>
Implement automated services to provision new equipment with certified baselines, enable proactive event scripting, and enable roll-backs of unauthorized changes.	<ul style="list-style-type: none"> <li>• Enables deployment of devices provisioned with certified baselines increasing operational reliability while reducing costs.</li> <li>• Enables execution of predetermined automated actions (scripts) based on monitoring thresholds.</li> </ul>	<ul style="list-style-type: none"> <li>• Selection and implementation of software that links workflow with license tracking software/database.</li> <li>• Need to identify titles for self-service.</li> <li>• Need to enable automatic delivery of titles to users</li> </ul>	<ul style="list-style-type: none"> <li>• Industry best practices currently embrace adopting and expanding IT automation as a key component of increasing operational reliability and reduction of ongoing operating costs.</li> </ul>
Consolidate and virtualize servers. (Note: ITDR and new projects may require addition of new servers; however, virtualization will minimize the impact from new requirements).	<ul style="list-style-type: none"> <li>• Reduces number of physical servers leading to lower hardware costs, license costs, lower staffing levels/costs, and lower power consumption.</li> <li>• Enables reduction of data centers and associated resource/maintenance costs.</li> </ul>	<ul style="list-style-type: none"> <li>• Requires use of management and monitoring tools to achieve and manage consolidated and virtualized servers.</li> </ul>	<ul style="list-style-type: none"> <li>• Industry best practices embrace adopting and expanding server consolidation and virtualization to reduce ongoing operating costs (licensing costs, hardware costs, and labor costs) as well as reducing carbon foot print with associated reduced power and cooling costs.</li> </ul>





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<b>Portfolio Strategy</b>	<b>Benefits</b>	<b>Challenges/Issues</b>	<b>Asset Portfolio Outlook</b>
Implement tiered storage.	<ul style="list-style-type: none"> <li>• Reduces total cost of storage while reducing overhead associated with data backups and recovery.</li> </ul>	<ul style="list-style-type: none"> <li>• Data retention needs to be more widely defined and enforced.</li> <li>• Data archiving needs to be defined and addressed.</li> <li>• Overcoming hesitation to employ cloud services.</li> </ul>	<ul style="list-style-type: none"> <li>• Implementing tiered storage is a key component of industry best practices to control the growth, costs, and power consumption associated with storage.</li> </ul>
Adopt 5 year refresh cycle:	<ul style="list-style-type: none"> <li>• Optimizes total cost of ownership with operational reliability and stability.</li> <li>• Reduces cost and potential disruptions associated with migrating systems to new hardware.</li> </ul>	<ul style="list-style-type: none"> <li>• Longer lead time in adopting and implementing new technology and capabilities.</li> <li>• Higher maintenance costs over 3 year refresh cycle.</li> </ul>	<ul style="list-style-type: none"> <li>• Majority of industry has adopted a 3 to 4 year server refresh cycle with 3 years being the norm for high transactional, high concurrent user organizations</li> <li>• BPA's systems are low transactional, low concurrent user systems with emphasis on system stability. A 5 year cycle optimizes total cost of ownership and system stability for BPA.</li> </ul>
Align operating system and database upgrades with hardware refreshes.	<ul style="list-style-type: none"> <li>• Minimizes cost and disruption of migrating to new operating systems and databases by coordinating testing and deployment with rollout of replacement hardware.</li> </ul>	<ul style="list-style-type: none"> <li>• Longer lead time for adoption of operating system and database new features/capabilities.</li> </ul>	<ul style="list-style-type: none"> <li>• J intends to minimize labor and testing costs by aligning move to major releases of operating system and databases with the five year server refresh cycle.</li> </ul>
Develop approach for cloud services. Candidates for the cloud include <ul style="list-style-type: none"> <li>• Email</li> <li>• Web conferencing</li> <li>• Web presence</li> <li>• Archive Services</li> <li>• Dev activities</li> </ul>	<ul style="list-style-type: none"> <li>• Leverages reliability and economy of scale of large data centers leveraging cloud's inherent capabilities               <ul style="list-style-type: none"> <li>○ High reliability</li> <li>○ Site failover</li> <li>○ Backup/recovery</li> <li>○ Archiving</li> <li>○ eDiscovery</li> <li>○ Hardware refresh</li> <li>○ Monitoring</li> <li>○ Security device</li> </ul> </li> <li>• Moves servers out of BPA data center into highly optimized data centers with lower cost of operations and lower carbon footprint.</li> </ul>	<ul style="list-style-type: none"> <li>• Additional or increased bandwidths for circuits to cloud based services may offset savings.</li> <li>• Performance of cloud base services needs to be monitored and managed.</li> <li>• Security risks need to be evaluated and assessed.</li> <li>• Interoperability issues need to be evaluated.</li> </ul>	<ul style="list-style-type: none"> <li>• Federal government is moving to cloud based services with agencies like USDA and GSA leading the way moving to email cloud services.</li> <li>• J is conducting a small scale pilot to investigate benefits and drawbacks to adopting cloud based services.</li> </ul>

**Table 4.4: Data Center Portfolio Strategies**

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**FY 2014 BPA IT Asset Strategy Plan****4.5 Asset Portfolio Outcomes**

<b>Data Center Objectives</b>	<b>Portfolio Strategy</b>	<b>Asset Portfolio Measures</b>
Maximize resource utilization while providing capacity to meet systems' current and projected average and peak resource requirements.	<ul style="list-style-type: none"> <li>• Implement management tools.</li> <li>• Consolidate and virtualize servers.</li> <li>• Implement tiered storage.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce current fleet of 838 physical servers to 400 or fewer by 4<sup>th</sup> quarter FY2016.</li> <li>• Non -infrastructure production server resource utilization average is greater than 45% during core business hours by end of 4<sup>th</sup> quarter FY2016.</li> </ul>
Proactively monitor data center resources and services.	<ul style="list-style-type: none"> <li>• Implement management tools.</li> <li>• Implement automated services.</li> </ul>	<ul style="list-style-type: none"> <li>• Enable monitoring on all IVC production servers key resources (e.g. CPU, etc.) as servers are placed into production with monthly usage reports and real-time snapshots beginning 4<sup>th</sup> quarter FY2015.</li> <li>• Enable monitoring of all SAN disk space by 3<sup>rd</sup> quarter FY2014 with monthly usage reports and real-time snapshots beginning in 4<sup>th</sup> quarter FY2014.</li> </ul>
Deliver secure, reliable, efficient, and predictable services through the effective use of management tools.	<ul style="list-style-type: none"> <li>• Implement management tools.</li> <li>• Implement automated services.</li> </ul>	<ul style="list-style-type: none"> <li>• Enable capacity planning for all production servers and SAN devices, providing monthly reports beginning 4<sup>th</sup> quarter FY2014.</li> </ul>
Leverage technology to achieve efficiencies.	<ul style="list-style-type: none"> <li>• Implement management tools.</li> <li>• Implement automated services</li> <li>• Consolidate and virtualize servers.</li> <li>• Implement tiered storage</li> <li>• Develop approach for cloud services.</li> <li>• Adopt 5 year refresh cycle</li> <li>• Align operating system and database upgrades with hardware refreshes.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce FY2012 energy consumption for production by 20% by EOY2016 (coincides with migration to new environment delivered by IVC).</li> <li>• Through EOY2016 absorb inflation and maintain operations and maintenance costs of data center at or below EOY2012 levels.</li> </ul>
Achieve reliable and available services to support and meet BPA's Continuity of Operations Requirements (COOP).	<ul style="list-style-type: none"> <li>• Implement management tools.</li> <li>• Implement automated services.</li> </ul>	<ul style="list-style-type: none"> <li>• Exercise COOP plans for Critical Business Systems twice a year.</li> <li>• Extend telework capacity to 7100% of BPA personnel by EOY2015.</li> <li>• Develop non-CBS COOP/DR capability and exercise twice a year.</li> </ul>
Services are delivered and asset components maintained in compliance with Federal laws and regulations.	<ul style="list-style-type: none"> <li>• Implement management tools.</li> <li>• Implement automated services.</li> <li>• Implement tiered storage.</li> </ul>	<ul style="list-style-type: none"> <li>• Implement configuration monitoring for all production servers with monthly compliance reports by 4<sup>th</sup> quarter FY2015.</li> </ul>
Processes and practices aligned with industry practices to deliver secure, reliable services with the least total cost of ownership.	<ul style="list-style-type: none"> <li>• Implement management tools.</li> <li>• Implement automated services.</li> <li>• Consolidate and virtualize servers.</li> <li>• Implement tiered storage.</li> </ul>	<ul style="list-style-type: none"> <li>• Self-service provisioning is enabled by EOY2015.</li> </ul>

**Table 4.5: Data Center Portfolio Outcomes**

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**FY 2014 BPA IT Asset Strategy Plan****4.6 Future Initiatives**

<b>Major Initiatives</b>	<b>FY2014</b>	<b>FY2015</b>	<b>FY2016</b>	<b>FY2017</b>	<b>FY2018</b>	<b>FY2019</b>	<b>FY2020</b>	<b>FY2021</b>
<b>Sustain</b>	Refresh IVC Bld2 storage \$3.0M C (550TB)	Replace data backup \$1.0M C, \$250K E	Replace data backup \$1.0M C	Refresh VDI storage \$350K C (50TB)		Refresh Dev/Bld storage \$2.5M C	Refresh data backup \$1.0M C	Refresh solid state disks \$500K E
	Refresh IVC Bld2 Servers \$2.36M C (introduce blades)	Isolate SQL Storage \$200K E	Refresh IVC non-blades \$240K E		Refresh Exadata \$2.0M C, \$400K E	Refresh IVC blades \$2.3M C		Refresh IVC non-blades \$240K E
		Refresh CBS Servers \$1.0M E					Refresh CBS Servers \$1.0M E	
		Refresh CBS storage controllers \$120K C			Refresh Prod/ITE storage \$4.5M C			
		Refresh CBS Dev storage \$820K C			Refresh CBS Storage \$3.5M C			
		Migrate DMZ/Dev to cloud \$440K E	DMZ/Dev Cloud Services \$100K E	DMZ/Dev Cloud Services \$110K E	DMZ/Dev Cloud Services \$120K E	DMZ/Dev Cloud Services \$200K E	DMZ/Dev Cloud Services \$200K E	DMZ/Dev Cloud Services \$200K E
					Migrate email to cloud \$410K E	Email Cloud Services \$720K E	Email Cloud Services \$720K E	Email Cloud Services \$720K E
<b>Compliance</b>								
<b>Expand</b>			Add 200TB Storage \$300K E	Add 200TB Storage \$300K E	Add 200TB Storage \$300K E	Add 200TB Storage \$300K E	Add 200TB Storage \$300K E	Add 200TB Storage \$300K E
			Integrate Solid State Disks \$500K E					

**Table 4.6: Datacenter Major Initiatives**

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JND	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Labor	\$3.1M	\$4.0M	\$4.2M	\$4.4M	\$4.8M	\$4.9M	\$5.0M	\$5.1M
Materials	\$690K	\$870K	\$981K	\$1.1M	\$263K	\$1.15M	\$1.2M	\$1.25M
Contracts	\$2.9M	\$3.2M	\$3.5M	\$3.5M	\$3.5M	\$3.6M	\$3.7M	\$3.8M
Total	\$6.69M	\$8.07M	\$8.48M	\$9.0M	\$8.56M	\$9.65M	\$9.9M	\$10.15M

**Table 4.7: Datacenter Portfolio Datacenter Expense Requirements**

JNI	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Labor	\$2.5M	\$2.55M	\$2.64M	\$2.63M	\$2.67M	\$2.71M	\$2.75M	\$2.8M
Materials	\$471K	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Contracts	\$318K	\$323K	\$280K	\$285K	\$1.06M	\$1.07M	\$1.09M	\$1.11M
Total	\$3.29M	\$2.87M	\$2.92M	\$2.92M	\$3.73M	\$3.78M	\$3.84M	\$3.91M

**Table 4.8: Datacenter Portfolio Infrastructure Expense Requirements**

JSO	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Labor	\$4.97M	\$5.3M	\$5.25M	\$5.36M	\$5.13M	\$5.06M	\$5.16M	\$5.26M
Materials	\$312K	\$324K	\$337K	\$351K	\$365K	\$379K	\$394K	\$408
Contracts	\$760K	\$773K	\$805K	\$838K	\$871K	\$906K	\$940K	\$976K
Total	\$6.04M	\$6.4M	\$6.39M	\$6.55M	\$6.37M	\$6.35M	\$6.49M	\$6.64M

**Table 4.9: Datacenter Portfolio Operations Expense Requirements**

JCO	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Labor	\$900K	\$961K	\$976K	\$990K	\$997K	\$1.01M	\$1.03M	\$1.05M
Materials	\$0	\$1.0M	\$0	\$0	\$0	\$0	\$1.0M	\$0
Contracts	\$1.48M	\$2.73M	\$2.87M	\$2.92M	\$2.96M	\$3.01M	\$3.06M	\$3.11M
Total	\$2.38M	\$4.69M	\$3.85M	\$3.91M	\$3.96M	\$4.02M	\$5.09M	\$4.16M

**Table 4.10: Datacenter Portfolio CBS Expense Requirements**

Combined	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Labor	\$11.47M	\$12.81M	\$13.07M	\$13.38M	\$13.6M	\$13.68M	\$13.94M	\$14.21M
Materials	\$1.47M	\$2.19M	\$1.32M	\$1.45M	\$630K	\$1.53M	\$2.59M	\$1.66M
Contracts	\$5.46M	\$7.03M	\$7.46M	\$7.54M	\$8.39M	\$8.59M	\$8.79M	\$9.0M
Total	\$18.4M	\$22.03M	\$21.84M	\$22.37M	\$22.62M	\$23.8M	\$25.32M	\$24.86M
Target								
High	\$20.24M	\$24.23M	\$24.02M	\$24.60M	\$24.88M	\$26.18M	\$27.85M	\$27.34M
Low	\$17.48M	\$20.93M	\$20.75M	\$21.25M	\$21.49M	\$22.61M	\$24.06M	\$23.62M

**Table 4.11: Datacenter Portfolio Combined Expense Requirements**

	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Total	\$5.36M	\$1.94M	\$1.0M	\$350K	\$10.0M	\$4.8M	\$1.0M	\$0
Target								
High	\$5.89M	\$2.13M	\$1.1M	\$385K	\$11.0M	\$5.28M	\$1.1M	\$0
Low	\$5.09M	\$1.84M	\$950K	\$333K	\$9.5M	\$4.56M	\$950K	\$0

**Table 4.12: Datacenter Portfolio Capital Requirements**

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**FY 2014 BPA IT Asset Strategy Plan****5.0 Network Portfolio**

The services delivered through the Network Portfolio can best be described as utility services in the sense that end users expect the services to be available without thinking about them, just like the electric power in their offices. As a result, these asset objectives tend to have an internal IT aspect to them. However, video conferencing, tele-presence, and mobile connectivity are areas where business units and IT can partner to develop network service objectives and strategies to maintain or enhance existing services, and to implement new services, such as wireless access points, where requirements dictate.

**5.1 Goals & Objectives**

The following table shows the alignment of the Enterprise Networking and Voice & Video services objectives with the general IT Asset Goals:

<b>Network Objectives</b>	<b>Aligns with IT Asset Goals</b>	<b>Outcomes</b>
Provide secure and reliable voice and data network services to enable the BPA to perform its functions and to coordinate and communicate internally and externally.	ITAG 1 –P <sup>28</sup> ITAG 3 –S	<ul style="list-style-type: none"> <li>• Detection and prevention (ISE / NAC) of unauthorized access.</li> <li>• Capacity and redundancy to meet general availability and return to operations objectives, and specific Continuity of Operations (COOP) objectives.</li> <li>• Sufficient network capacity utilizing modern circuits to ensure quality of service (low latency) to enable users to effectively and efficiently access IT resources to perform their jobs.</li> <li>• Reliable phone services to enable the BPA to coordinate and communicate internally and externally (VoIP).</li> <li>• Secure remote access to BPA IT resources.</li> </ul>
Leverage technology to meet BPA business objectives.	ITAG 3 – S	<ul style="list-style-type: none"> <li>• Reliable video conferencing and tele-presence capabilities (VoIP).</li> <li>• Secure and reliable wireless access.</li> <li>• Secure and reliable services for mobile users.</li> <li>• Unified messaging/communication capabilities are provided (VoIP).</li> <li>• Continuous monitoring program tracks performance and utilization in order to predict and proactively mitigate performance issues.</li> <li>• Access, security (firewall), and adequate bandwidth to the public internet are sufficient to meet emerging cloud computing requirements.</li> </ul>

<sup>28</sup> Each objective relates to a single primary goal indicated by “P”; objectives may also relate to a secondary goal, indicated by “S”.



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<b>Network Objectives</b>	<b>Aligns with IT Asset Goals</b>	<b>Outcomes</b>
Services are delivered and asset components maintained in compliance with Federal laws and regulations.	ITAG 1 – P ITAG 3 - S	<ul style="list-style-type: none"> <li>Continuous monitoring program tracks compliance with baselines and detects unauthorized changes from the baseline.</li> <li>Risks mitigated to acceptable levels to enable the BPA to perform its functions.</li> <li>Begin network migration to use IPv6 (FY2014).</li> <li>External-facing connections are Trusted Internet Connection (TIC) compliant.</li> <li>Smart Cards used in two factor authentication for network access (ICAM project).</li> <li>Separation of duties is supported through network segregation and Critical Business systems segregated in a secure network enclave.</li> <li>Expand remote access to align and enable Federal Telework directives (DMZ Project).</li> <li>System Security Plans (SSP) are documented and approved.</li> </ul>
Processes and practices aligned with industry practices to deliver secure, reliable services with the least total cost of ownership.	ITAG 4 – P ITAG 2 – S ITAG 3 - S	<ul style="list-style-type: none"> <li>Network hardware and software refreshes sufficient to meet reliability and security objectives while optimizing the total cost of ownership.</li> <li>Costs of new investments balanced with operations and maintenance costs to achieve an optimized total cost of operations.</li> <li>Logical Access Control is transitioned to Networking in FY2014.</li> </ul>

**Table 5.1: Network Portfolio Objectives****5.2 Asset Current State**

The major aspects of the Network Portfolio can be summarized as:

- Identifying and documenting asset business objectives, risks, and associated metrics.
- Implementing network segmentation architecture.
- Expand monitoring and reporting capabilities to improve security, meantime-to-repair, network reliability and availability, and predictive performance trending.
- Expand outside-of-network-monitoring data integration to improve IT monitoring capabilities, security, and accessibility.
- Expand firewall administration and advanced packet analysis staff capabilities to improve security, service delivery, and achieve additional efficiencies.
- Improving component conditions to meet business demands, and to achieve compliance with Federal mandates relating to IPv6 and Trusted Internet Connections (TIC).

The current status of the network assets are discussed in detail below.

The current Network Portfolio includes 1000+ network devices and 7 PBX systems spread across a four state region. The average lifecycle varies for network, voice, and video equipment with network equipment averaging seven to nine years, voice averaging twelve to fifteen years, and video averaging eight to ten years. The cabling in headquarters and portions of the Ross Complex were recently upgraded to CAT 6 to provide 100 mb/s connectivity to the desktop. The remainder of the Ross Complex is scheduled to have its cabling infrastructure upgraded to CAT 6 in FY2014 as will the Bell site in order to support the VoIP requirements of the adjacent scheduling center. In addition, the next few years will reveal a number of building



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construction and remodel projects across the region. It is imperative that IT work closely with the Facilities Management groups to align asset plans in order to:

- Ensure that Facilities programs the funding for cabling (as network cabling is a common building resource similar to electric cabling)
- Network cabling meets defined standards
- Location of ancillary network equipment is properly architected

The network has been providing solid performance over the last five years with no service disruption of core services in Headquarters or the Ross Complex. Branch offices have seen minor disruptions due to issues with external circuit providers resulting from fiber being cut or other issues that are generally quickly resolved. The majority of service disruptions to field sites are the result of unconditioned power used to run on-site equipment in remote locations, and it has proven to be cost inefficient to attempt to provide conditioned power in these locations. Managing this diverse and disparate collection of assets across a large geographic area offers distinct and daunting challenges, requiring a phased and iterative process that can span multiple fiscal and calendar years and include the coordination and cooperation of IT, Transmission Services, Power Services, and a variety of governmental and private sector service providers.

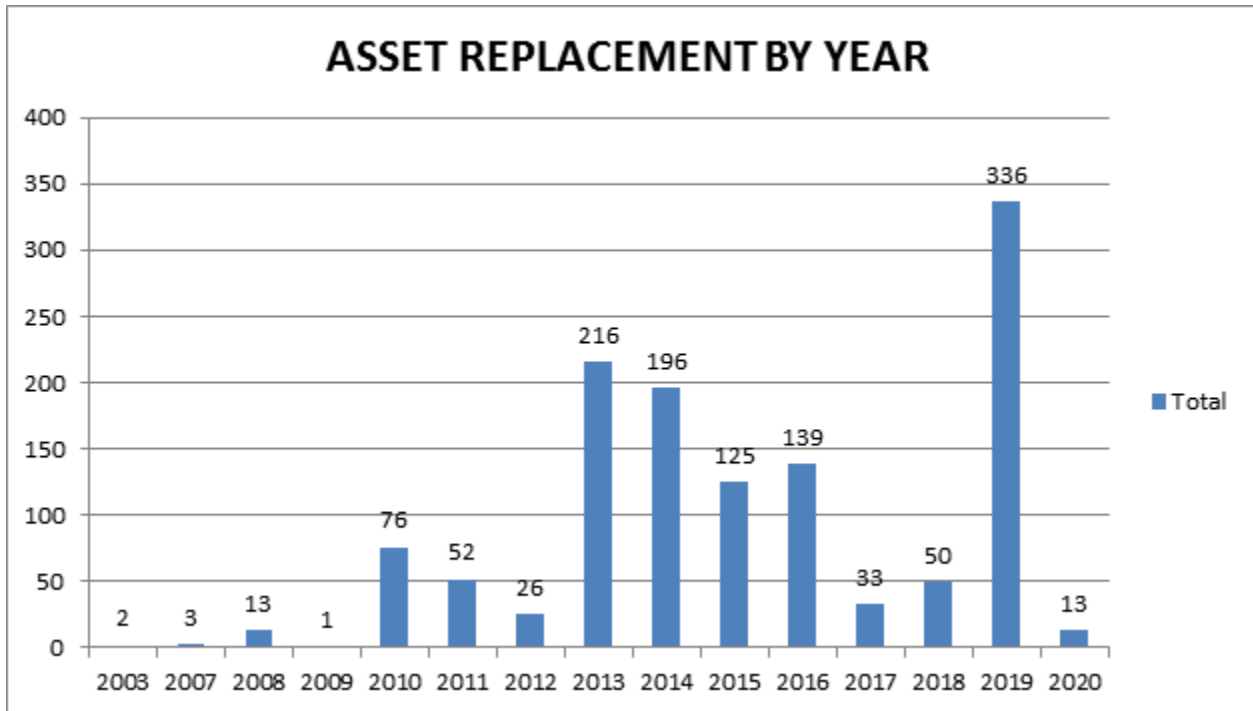
Several OMB mandates and other upgrade/modernization projects will drive the network portfolio to modernize equipment and cabling in the coming years. Specific technologies on the near horizon include IPv6 compliance, expansion of wireless services, LAN/WAN bandwidth upgrades, ubiquitous computing (tablet computing), and broadcast streaming media services such as VoIP and video. It is expected that the business will make selective moves to cloud services over the coming years, which will require the Network portfolio to ensure access (circuits – generally public internet) and security (firewall) and bandwidth to meet business demands.

Due to relatively long lifecycles, the replacement of the aging Network Portfolio equipment requires acquiring new network, voice, and video hardware compliant with our standards for Internet Protocol version 6 (IPv6), Simple Network Management Protocol version 3 (SNMP V3), Syslog, Quality of Service (QoS), Power Over Ethernet (PoE), Unified Communications (UC), and Voice Over Internet Protocol (VoIP). It is necessary to continue to acquire compliant components now in order to migrate to new capabilities in the very near future, for example to migrate to IPv6 (an OMB mandate) in 2015 and VoIP (enhanced business service), as well as enabling a steady approach to the adoption of select cloud services. The Network End of Life Schedule can be seen below:





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**FY 2014 BPA IT Asset Strategy Plan****Figure 5.1: Network Components End of Life Schedule**





A review of our leased network circuits reveals that increased bandwidth and redundancy will be required to support those services, resulting in higher annual service contract costs for leased circuits. These same pressures will drive the need to upgrade local cabling plants in several locations throughout the agency in the near future. The demand to support the upcoming services outlined above are likely to drive this portfolio to experience a near-term jump in expense requirements, followed by an expense growth rate equal to the rate of inflation.

While wireless capability has been added to the Headquarters location, the steady increase in demand for mobile services will drive the expansion of those services to other locations such as the Ross Complex and Park Place. The rate of deployment of these services has been somewhat hampered by the convergence of the conflicting desires of client flexibility and corporate control. Providing open mobility for our employees and internet access for guests, while keeping the network secure and keeping acceptable use within appropriate boundaries, continues to provide challenges although forward progress remains slow and steady.



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<b>Network Objectives</b>	<b>Status Meeting Objectives</b>	<b>Comments</b>
Provide secure and reliable voice and data network services to enable the BPA to perform its functions and to coordinate and communicate internally and externally.		<ul style="list-style-type: none"> <li>• BPA's telecommunications backbone has a longstanding reputation for delivering secure, reliable, and highly available voice and data services throughout the BPA.</li> <li>• Power fluxes at some substations are producing momentary loss of network services. Services are typically quickly restored. Business impact has been minimal.</li> <li>• Parts availability becomes an increasing challenge as systems approach end of life, risking continued reliability.</li> <li>• Secondary circuits are not able to provide connectivity with sufficient bandwidth when primaries fail.</li> </ul>
Leverage technology to meet BPA business objectives.		<ul style="list-style-type: none"> <li>• Through the use of proven, scalable technologies and adaptive, low-latency, high-availability architectures, BPA's voice and data needs and objectives have been, and will continue to be, met and/or exceeded.</li> <li>• BPA must evolve WAN circuits to provide sufficient bandwidth to support emerging business requirements such as streaming video/video broadcast, VoIP, and video teleconferencing.</li> <li>• Continue to replace existing CAT 5e cable plant with CAT6 LAN cabling to support increased LAN bandwidth requirements.</li> <li>• Telecommuting and expanded business outreach is generating increased usage of the BPA audio conference system and circuits. Adoption of VoIP and Unified Communications will increase the reliability and capability of these systems.</li> </ul>
Services are delivered and asset components maintained in compliance with Federal laws and regulations.		<ul style="list-style-type: none"> <li>• Although late in meeting Federal mandates to operate IPv6 protocols on the network, momentum is building to make a concerted effort to move this initiative forward. The business need to accomplish this has been quite low to date.</li> <li>• Federal initiatives across the government for Trusted Internet Connection (TIC) have languished in budget set-backs for some years. However, there has been sufficient progress in this area to have some agencies that BPA communicates with demand that communication utilize TIC. We will have to address this very soon.</li> </ul>
Process and practices aligned with industry practices to deliver secure, reliable services with the least total cost of ownership.		<ul style="list-style-type: none"> <li>• Although some effort has been expended to adopt a maturity model and advance along its curve, adoption has been very slow to materialize. This is not unique to the network portfolio, but rather system across all of the IT organization.</li> </ul>

**Table 5.2: Current State of Network Portfolio Objectives**

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**FY 2014 BPA IT Asset Strategy Plan****5.3 Risks**

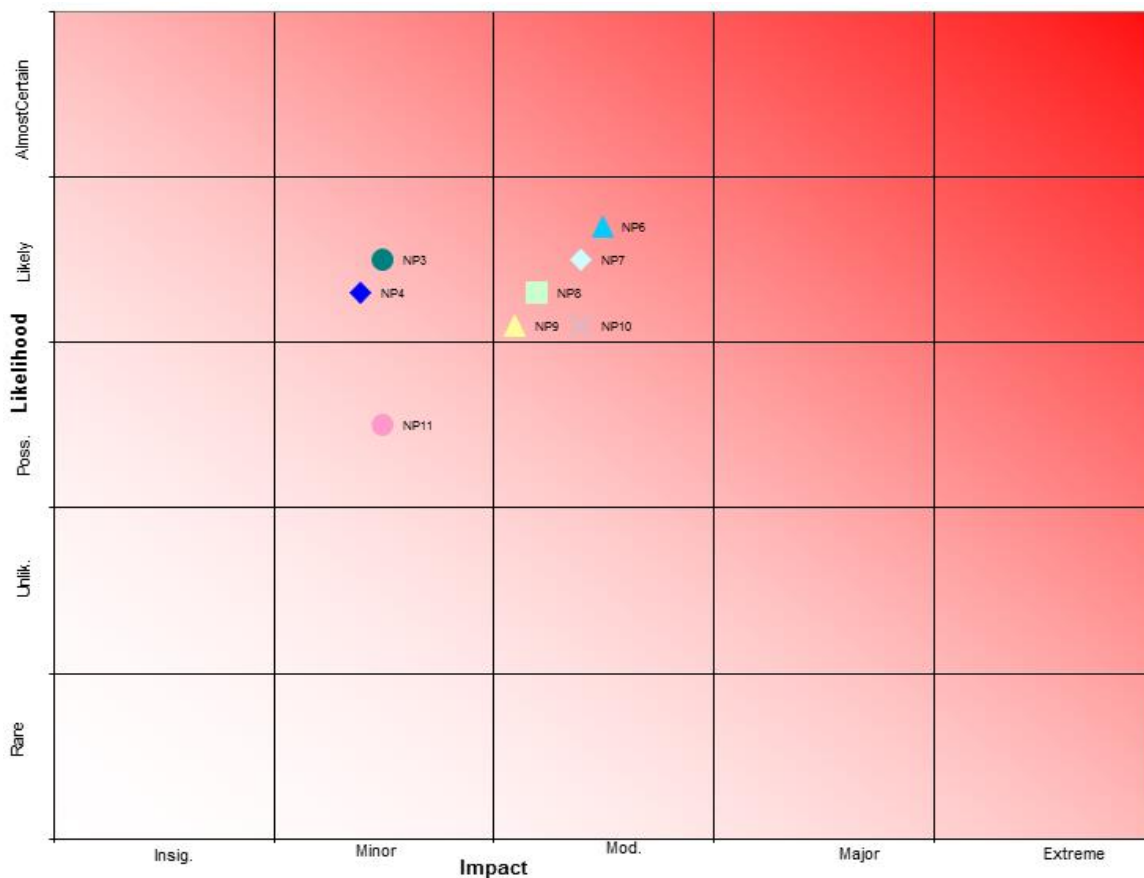
<b>ID</b>	<b>Risk</b>		<b>Mitigation</b>
NP3	Failure to implement and leverage the necessary management and monitoring tools to enable expansion, maintenance, troubleshooting, and reporting-on existing and future networks.		Implement purchasing guidelines requiring the inclusion of management and monitoring tools, plans, and methodologies to be implemented with each new purchase. Since Cisco is our primary provider, inculcate their native management and monitoring tools into daily operations of the network. Leverage additional Sunflower modules to effectively track status of network component inventories.
	Likely	Minor (\$100K - \$1M)	
NP4	Failure to position and prepare BPA's systems and services to meet emerging security threats.		Work closely with Cyber Security to maintain existing security infrastructure Intrusion Detection Systems (IDS), next-generation firewalls, ISE/NAC, etc.) while harnessing emerging technologies and methodologies to further enhance our security coverage.
	Likely	Minor (\$100K - \$1M)	
NP6	Failure to plan, prepare, and position resources to migrate to IPv6.		Establish business plan and project proposal to meet this regulatory requirement.
	Likely	Moderate (\$1M - \$10M)	
NP7	Failure to plan, prepare, and position resources to migrate to TIC.		Establish business plan and project proposal to meet this regulatory requirement. Work closely with DOE to ensure adequate service availability.
	Likely	Moderate (\$1M - \$10M)	
NP8	Internet bandwidth could be consumed at a higher rate or larger peaks than can be met by capacity.		Track utilization growth patterns with Cisco monitoring tools, collect expected capacity increase requirements from MyPC/Mobility and cloud initiative efforts, and predict timelines for service upgrades. Implement annual disaster capacity testing.
	Likely	Moderate (\$1M - \$10M)	
NP9	Video conferencing and collaboration demands may overwhelm network performance.		Leverage network assessments being performed through current VoIP project, along with Cisco monitoring information, to track and predict network bottlenecks, and plan appropriate upgrades.
	Likely	Moderate (\$1M - \$10M)	
NP10	Convergence of data and voice networks may drive up near-term budgets.		Inventory all building cable plants to determine upgrades required to converge data and voice onto the same infrastructure. Cross-train or re-staff to meet skills needed for a converged voice and data network.
	Likely	Moderate (\$1M - \$10M)	
NP11	Convergence of IT and OT network organizations may impact work plans.		Begin dialogues early to identify insipient issues around standards, operational norms, gap analysis, etc.
	Possible	Minor \$100K - \$1M	



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ID	Risks Mitigated to Acceptable Levels	Mitigation
NP1	Failure to procure network components and application software to support network standards to enable the evolution of the network to support IPv6, SNMPv3, Power over Ethernet (POE), multicast, fault tolerance, and Quality of Services (QOS).	All of these capabilities were included in purchasing considerations. At the same time, this risk was mitigated by most major vendors developing these capabilities as standards for their equipment.
NP2	Failure to adequately train staff will to ensure staff can support evolution of network to support new technologies and management techniques.	Annual training budget has been provided to each organization. In addition, training elements are required in all new project efforts.
NP5	Failure to replace systems at or near End-of-Life, particularly the BPA voice messaging system	Network equipment refresh project is planned for FY2015 for general equipment, based on end-of-life information, and capability and performance requirements. VoIP project is currently underway for Munro, and will continue to HQ/Ross in FY2014/15.

**Table 5.3: Network Portfolio Risks****Figure 5.2: Network Risks**

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**FY 2014 BPA IT Asset Strategy Plan****5.4 Strategies**

<b>Portfolio Strategy</b>	<b>Benefits</b>	<b>Challenges/Issues</b>	<b>Outlook</b>
Execute on established refresh cycles to optimize total cost of ownership.	<ul style="list-style-type: none"> <li>Provides for orderly, non-disruptive, and cost effective insertion of new technology.</li> </ul>	<ul style="list-style-type: none"> <li>Long lifecycles for network and phone devices results in delays in implementing new technology and deploying new capabilities.</li> <li>Next network refresh cycle will need to plan for:               <ul style="list-style-type: none"> <li>Implementation of IPv6</li> <li>Expanding Voice over IP to HQ and Ross.</li> <li>Increased adoption of telecommuting/mobility places greater demand on conference bridge systems and circuits.</li> <li>Expanded wireless access points with integration into network</li> <li>Possible deployment of soft phones</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Phone and network systems must achieve 99.99% availability or better. While past experience has demonstrated excellent reliability and stability, these systems are pervasive, and upgrade implementations are complex and long in duration.               <ul style="list-style-type: none"> <li>Network refresh scheduled for FY2015 timeframe.</li> <li>Phone refresh schedules include migration to VoIP and use of VoIP handsets and/or softphones in the FY2014-FY2015 timeframe.</li> </ul> </li> </ul>
Institutionalize Operational Excellence to improve service delivery, increase work throughput, and achieve efficiencies.	<ul style="list-style-type: none"> <li>Implementing and incorporating a maturity model into daily operations will improve operational reliability while reducing maintenance labor costs. IT can expect to see a reduction in operations labor costs of 10% <sup>29</sup>by moving a level in the maturity model.</li> </ul>	<ul style="list-style-type: none"> <li>IT culture has not lent itself to change and/or documenting processes and their supporting roles. This will require change management to be completely successful.</li> <li>Although a few specific technologies were implemented during the first attempts, it was difficult to agree on which maturity system to implement, and support has waned.</li> </ul>	<ul style="list-style-type: none"> <li>Industry has embraced ITIL to improve operational reliability, improve quality of service, and to reduce cost of operations.</li> <li>IT in general may re-start the effort to implement a maturity project to move IT operations from basic to standard level for four key processes.</li> </ul>

**Table 5.4: Network Portfolio Strategies**

<sup>29</sup> Ross & Weill, Harvard Business Review, Nov 2002.



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**FY 2014 BPA IT Asset Strategy Plan****5.5 Asset Portfolio Outcomes**

<b>Network Objectives</b>	<b>Strategy</b>	<b>Asset Portfolio Measures</b>
Provide secure and reliable voice and data network services to enable the BPA to perform their functions and to coordinate and communicate internally and externally.	<ul style="list-style-type: none"> <li>• Refresh Cycles</li> <li>• Operational Excellence</li> </ul>	<ul style="list-style-type: none"> <li>• Deliver 99.9% network availability in Headquarters, Ross and Munro through FY2018 to enable BPA to coordinate and communicate effectively.</li> <li>• Deliver 99.9% phone service availability through FY2018 to enable BPA to coordinate and communicate effectively.</li> <li>• Reduce the yearly number of Wide Area Network disruptions to field sites by 50% of FY2010 disruptions by end of FY2014.</li> </ul>
Leverage technology to meet BPA business objectives.	<ul style="list-style-type: none"> <li>• Refresh Cycles</li> </ul>	<ul style="list-style-type: none"> <li>• Develop plans, to include potential total cost of ownership for: <ul style="list-style-type: none"> <li>○ Complete Voice over IP implementation at Munro by Q3 FY2014, expand to HQ and Ross by EOY2015.</li> <li>○ Expand wireless network into Ross and Park Place, completed by 4<sup>th</sup> quarter FY2015.</li> <li>○ Integrate soft phones in to environment, plan completed by 1<sup>st</sup> quarter FY2014</li> <li>○ Implement a Unified Communications roadmap by 2nd quarter 2014</li> <li>○ Grow the BPA audio conference system and/or UC to meet increasing requirements for large audio conferences and support telework mandate by FY2014.</li> <li>○ Provide infrastructure support, bandwidth and connectivity to cloud services as business requirements emerge.</li> </ul> </li> </ul>
Services are delivered and asset components maintained in compliance with Federal laws and regulations.	<ul style="list-style-type: none"> <li>• Refresh Cycles</li> </ul>	<ul style="list-style-type: none"> <li>• Implement IPv6 by EOY2015 to comply with OMB guidance to develop plans and transition to IPv6.</li> <li>• Implement Smart cards for network logons by EOY2014 to comply with HSPD-12 directive to use Smart Cards for network access.</li> <li>• Migrate to TIC for externally facing internet connections by EOY2014 to comply with OMB mandates.</li> </ul>
Process and practices aligned with industry practices to deliver secure, reliable services with the least total cost of ownership.	<ul style="list-style-type: none"> <li>• Operational Excellence</li> </ul>	<ul style="list-style-type: none"> <li>• Establish the maturity model to be used throughout the IT organization by Q3 FY2014.</li> <li>• Evaluate status of key processes(Change &amp; Configuration Management, Incident Management, Problem Management, and System Monitoring) in relation to the MOF maturity framework by EOY2014.</li> <li>• Map the current status into the maturity model and develop plans to advance the maturity level, by Q1 FY2015.</li> <li>• Achieve next maturity level for all operational processes by EOY2015.</li> </ul>

**Table 5.5: Network Portfolio Outcomes**

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**FY 2014 BPA IT Asset Strategy Plan****5.6 Future Initiatives**

Major Initiatives	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
<b>Cabling</b>	New bldg at MSC, TRI, PAS, MHQ \$650K C							
	Refresh Ross and Park Place \$3.4M E	Refresh Ross and Park Place \$1.0M E						
<b>Sustain</b>	Network Client Connectivity \$1.6M C	Core Net Refresh \$500K C	Core Net Refresh \$1.5M C				Field Net Refresh \$2.0M C	Core Net Refresh \$2.0M C
		Refresh Firewalls \$100K E		Specialty Device Refresh \$36K C	Specialty Device Refresh \$36K C	Specialty Device Refresh \$36K C	Refresh Firewalls \$100K E	
	Refresh VTC Gear \$192K C	Refresh IDS \$500K E		Develop software-defined-networks \$500K E	Develop software-defined-networks \$500K E	Refresh VTC Gear \$200K C	Refresh IDS \$500K E	
	Prep VoIP at MSC and Bell \$1.8M C	Migrate to Enterprise VoIP \$1.8M C	Migrate to Enterprise VoIP \$750K C	Migrate Field to VoIP \$300K E	Migrate Field to VoIP \$300K E	Migrate Field to VoIP \$300K E	Refresh VoIP \$500K C	
							Migrate Field to VoIP \$300K E	
<b>Compliance</b>	DMZ IPv6 \$300K C	BPA Net IPv6 \$450K E	BPA Net IPv6 \$100K C, \$900K E					
		Migrate to TIC \$300K E						
<b>Expand</b>	Install wireless at Ross/VM \$300K C		Upgrade wireless to broadband \$500K E					
	IVC Upgrade DC to 10G \$2M C							

**Table 5.6: Network Major Initiatives**



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**FY 2014 BPA IT Asset Strategy Plan**

	<b>FY2014</b>	<b>FY2015</b>	<b>FY2016</b>	<b>FY2017</b>	<b>FY2018</b>	<b>FY2019</b>	<b>FY2020</b>	<b>FY2021</b>
Labor	\$3.91M	\$4.98M	\$5.06M	\$5.14M	\$5.23M	\$5.31M	\$5.4M	\$5.49M
Materials	\$280K	\$284K	\$289K	\$294K	\$299K	\$304K	\$309K	\$314K
Contracts <sup>30</sup>	\$4.5M	\$6.6M	\$6.1M	\$6.2M	\$6.4M	\$6.5M	\$6.7M	\$6.8M
Total	\$8.69M	\$11.86M	\$11.45M	\$11.63M	\$11.93M	\$12.11M	\$12.41M	\$12.6M
High	\$9.55M	\$13.04M	\$12.59M	\$12.79M	\$13.12M	\$13.32M	\$13.65M	\$13.86M
Low	\$8.26M	\$11.27M	\$10.88M	\$11.05M	\$11.33M	\$11.51M	\$11.79M	\$11.97M

**Table 5.7: Network Portfolio Expense Requirements**

	<b>FY2014</b>	<b>FY2015</b>	<b>FY2016</b>	<b>FY2017</b>	<b>FY2018</b>	<b>FY2019</b>	<b>FY2020</b>	<b>FY2021</b>
Total Target	\$6.85M	\$2.3M	\$2.35M	\$36K	\$36K	\$236K	\$2.5M	\$2.0M
High	\$7.53M	\$2.53M	\$2.58M	\$40K	\$40K	\$260K	\$2.75M	\$2.2M
Low	\$6.51M	\$2.19M	\$2.23M	\$34K	\$34K	\$224K	\$2.38M	\$1.9M

**Table 5.8: Network Portfolio Capital Requirements**

As can be seen in Table 5.7, there is a substantial increase in annual expense requirements beginning in FY15. This is due to meeting Federal Trusted Internet Connection (TIC) regulatory requirements, and meeting increased capacity demands from several initiatives. A review of our leased network circuits reveals that increased bandwidth and redundancy will be required to support those services, resulting in higher annual service contract costs for leased circuits. These same pressures will drive the need to upgrade local cabling plants in several locations throughout the agency in the near future, although the intent is to shift those cabling costs to the Facilities projects that are constructing or remodeling those sites. Adding to that uncertainty in the network portfolio spending profile is the possibility that IT and OT (Operations Technology – i.e. Grid Operations) networks may merge portfolios, requiring an adjustment to spending. It is also possible that unknown initiatives may emerge in the FY17 – FY18 timeframe that will have network portfolio implications. Other than the noted up-ticks in annual expense spending due to specific increased demands and regulations, this portfolio is expected to experience an expense growth rate equal to the rate of inflation.

**Outlook:**

- Labor and materials expense growth is expected to remain relatively flat, matching the rate of inflation.
- Contracts will grow in the near term due to:
  - TIC compliance
  - VoIP capacity demands
  - ADC/BSDR capacity demands
  - Growth in adoption of SaaS solutions
 And then match the rate of inflation
- Overall, the network portfolio expense profile will experience growth at the rate of inflation plus new contracts.

<sup>30</sup> This data is a combination of service contracts (equipment and software maintenance) and rents and utilities (annual phone and data circuits).



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**FY 2014 BPA IT Asset Strategy Plan****6. Application Portfolio**

The Application Portfolio currently accounts for 45% the IT expense budget with 6.5% providing system enhancements to meet emerging business needs. This portfolio presents unique challenges in describing its objectives as each one of the over 100 major systems in the Application Portfolio has its own set of objectives. For example, the Customer Billing System strives to produce timely and accurate bills while Columbia Vista creates generation forecasts to support inventory and revenue projections. Due to this unique situation, individual systems' objectives will be maintained in the individual asset plans that comprise the Application Portfolio. Here we will only present the BPA level objectives of the Application Portfolio

**6.1 Goals & Objectives**

<b>Application Objectives</b>	<b>Aligns with IT Asset Goals</b>	<b>Outcomes</b>
Enable secure and reliable automation of business processes and functions.	ITAG 1 –P	<ul style="list-style-type: none"> <li>• Service levels established for each system to include availability, and Return To Operation requirements.</li> <li>• Performance requirements established for major systems to include latency and peak usage requirements.</li> </ul>
Evolve and leverage systems capabilities to meet emerging business objectives.	ITAG 2 –P ITAG 3 –S	<ul style="list-style-type: none"> <li>• Develop and/or buy COTS solutions that leverage and, where possible, contribute to Service Oriented Architecture and data abstraction.</li> <li>• Develop and maintain a library of Enterprise reusable components and services to reduce development time, development costs, and maintenance costs.</li> <li>• Extending existing systems to meet emerging business needs, where feasible, through reusing services/capabilities, or extending by adding additional modules.</li> </ul>
Provide guidance on tactical and strategic evolution of systems that balance business unit's requirements with BPA objectives.	ITAG 2- S ITAG 3 -S	<ul style="list-style-type: none"> <li>• Asset Plans have multi-year activities scheduled for enhancements, upgrades, and replacement for each individual system as a result of the Information Owner and Information System Owner working together to create these plans.</li> <li>• Establish metrics, creating transparency on costs, value, and performance.</li> <li>• Annual review of each system's Total Cost of Ownership.<sup>31</sup></li> </ul>
Services are delivered and asset components maintained in compliance with Federal laws and regulations.	ITAG 1 –P ITAG 3 –S	<ul style="list-style-type: none"> <li>• All systems covered by a current System Security Plan.</li> <li>• Monitoring tools in place to detect and report on changes in application baselines.</li> <li>• All changes to application baselines verified and validated as authorized changes.</li> </ul>
Processes and practices aligned with industry practices to deliver secure, reliable services with the least total cost of ownership.	ITAG 4 – P ITAG 2 – S ITAG 3 – S	<ul style="list-style-type: none"> <li>• Establish individual Asset Plans for each major system.</li> <li>• Implement annual updates and reviews of each system's business cases</li> <li>• Align maintenance and enhancements with the System . Lifecycle.</li> <li>• Establish criteria for determining a "maintain" versus "upgrade" or "replace" decision.</li> <li>• Maturity framework in place for software development and operations.</li> </ul>

**Table 6.1: Applications Portfolio Objectives**

<sup>31</sup> Determining value and Total Cost of Ownership must be extended to include the substantial number of Task systems maintained by JS; although, individually each Task system represents a small to modest cost, collectively these Task systems represent a sizable investment and operating cost.



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**FY 2014 BPA IT Asset Strategy Plan****6.2 Asset Current State**

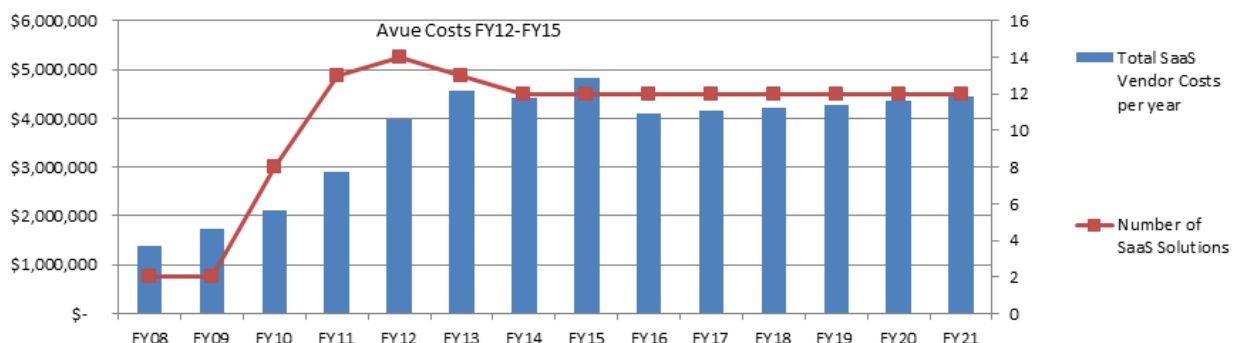
We have taken steps to control spending and the cost of information technology for BPA through managing the costs of our infrastructure assets. However, we are facing stiff challenges as new applications are delivered through the Project Work Plan and are placing upward pressure on the Application Portfolio expense budget from new service contracts and labor for operations and maintenance (see Figure 2.4). In past years, cost from new systems (service contracts and O&M costs) have been offset through a combination of reducing system enhancements and deferring hardware refreshes. This strategy coupled with the rapid pace of automation from FY2009-FY2013, has resulted in limiting resources needed to make enhancements. As a result, business units have expressed disappointment in IT's ability to make enhancements to their current solutions to meet emerging business needs. In other words, IT has been developing a backlog of business requested system enhancements.

Without understanding the business objectives and metrics to measure performance and value, a question of the amount of value these enhancements are providing cannot be answered. In other words, should IT be planning to allocate more or less resources to enhancements to optimize value and performance? For example, is it more cost effective to (1) upgrade versus enhance/modify the system (usually through customization) than to (2) replace the system versus upgrade.

The major aspects of maturing the Application Portfolio can be summarized as:

- Identifying business objectives, risks, and metrics for legacy systems
- Managing a growing portfolio of Software as a Service solutions
- Managing a rising bar on security and compliance requirements
- Identifying and projecting system enhancement needs and cost through the Asset Plans
- Developing Asset metrics to determine when systems need to be upgraded or replaced

A new trend has emerged over the last three years that needs to be accounted for in both the funding and staffing strategy for supporting the Application Portfolio. This trend is the adoption of Software as a Service (SaaS). This trend has IT contracting with a vendor to provide automated systems and services from the vendor owned and operated facilities. This introduces data integration, security, and funding issues that need to be carefully worked out. Figure 6.1 illustrates the emerging funding associated with SaaS (blue SaaS vendor costs).



**Figure 6.1: Expense Costs for Software As A Service (SaaS)**

As this figures shows, costs can escalate from year to year as the business unit requests the SaaS provider to make changes to accommodate emerging and evolving business requirements.



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The necessity to pay or lose service reduces the flexibility of IT's ability to shift funds to accommodate system enhancements or other needs.

In addition to the monthly service costs, IT labor is required to support SaaS solutions. This is counter intuitive to the concept of subscribing and having a service delivered by an external provider. The IT labor in operations and maintenance phase comes in the forms of:

- Creating and maintaining data integration with the hosted solutions,
- Working with the provider to resolve operational issues,
- Coordinating with the business unit and vendor on system enhancements,
- Coordinating with the business unit and vendor on testing system changes.

Table 6.2 summarizes the ability of the assets in the Application Portfolio to meet the Application Objectives from Table 6.1. As can be seen from Table 6.2, the mounting pressure on the Application Portfolio expense budget has resulted in a Red rating for this portfolio's ability to "Evolve and leverage systems capabilities to meet emerging business objectives." Through a combination of maturing Asset Plans, expanding steering committees, and partnering with business units to develop long-term system strategies based on business needs, IT plans to prioritize available resources for enhancements and to build justifications to grow the Application Portfolio's expense budget to meet business needs.

<b>Application Objectives</b>	<b>Status Meeting Objectives</b>	<b>Comments</b>
Enable secure and reliable automation of business processes and functions.		<ul style="list-style-type: none"> <li>• Improved Business Continuity capabilities for critical business systems.</li> <li>• Have implemented network segmentation to separate critical business systems and general business systems</li> </ul>
Evolve and leverage systems capabilities to meet emerging business objectives.		<ul style="list-style-type: none"> <li>• Improving reuse through the establishment of the Collaborative Standard Team – a team of software developers establishing standards to facilitate and promote object reuse.</li> </ul>
Provide guidance on tactical and strategic evolution of systems that balance business unit requirements with BPA objectives.		<ul style="list-style-type: none"> <li>• Steering committees have been established for major systems and programs so that Information Owners and Information System Owners together develop priorities for enhancements and new systems. These Information Owner boards include               <ul style="list-style-type: none"> <li>○ Power Services Customer Board</li> <li>○ Transmission Commercial Services</li> </ul> </li> </ul>
Services are delivered and asset components maintained in compliance with Federal laws and regulations.		<ul style="list-style-type: none"> <li>• Established System Security Plans</li> <li>• Establish and monitor Applications baselines</li> <li>• Increase rigor around change management</li> </ul>
Processes and practices aligned with industry practices to deliver secure, reliable services with the least total cost of ownership.		<ul style="list-style-type: none"> <li>• The SLC is being extended to               <ul style="list-style-type: none"> <li>○ Improve rigor in ensuring solutions provide least Total Cost of Ownership</li> <li>○ Cover routine and small enhancement projects</li> <li>○ Identify operations maintenance and cost</li> <li>○ Establish metrics to track business benefits (performance and value)</li> </ul> </li> <li>• Critical Business Systems will be releasing an RFI in FY2014 to identify and plan for the adoption of an appropriate software development maturity model</li> </ul>

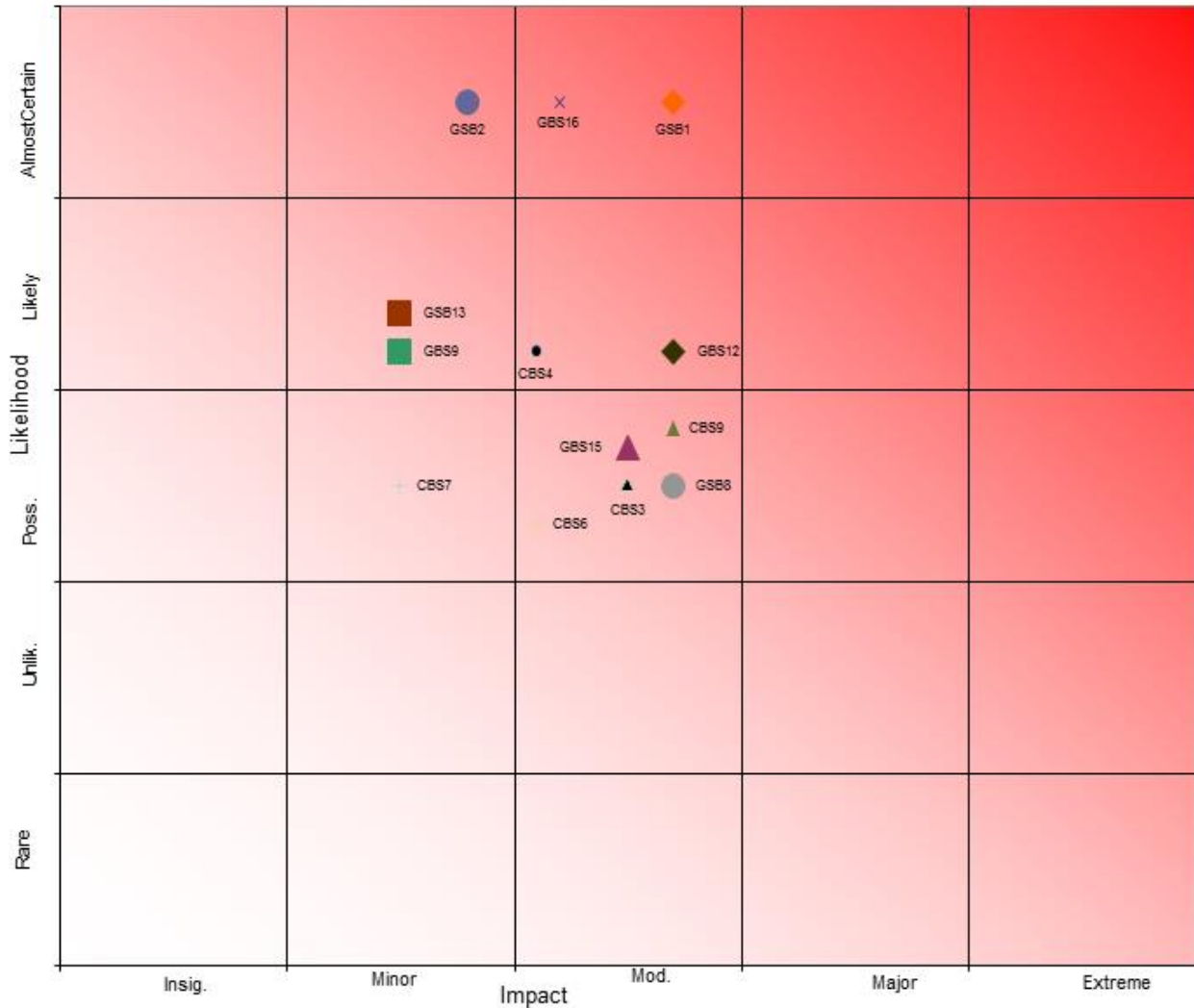
**Table 6.2: Status of Applications Portfolio in Meeting Objectives**



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**FY 2014 BPA IT Asset Strategy Plan****6.3 Risks**

In reviewing the risks with application subject matter experts, it has been determined that a number of risks have been mitigated downward in terms of likelihood and consequence and as a result they have been dropped. In addition, one new risk around data quality (GBS16) has been added. The risk heat map for our Critical Business Systems (CBS) and General Business Systems(GBS) is given in Figure 6.2.

**Figure 6.2: Application Portfolio Risk Map**

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**FY 2014 BPA IT Asset Strategy Plan**

ID	Risk		Mitigation
	Likelihood	Impact	
GBS1	Failure to fund resources to enhance systems at levels to meet business units' expectations.		<ul style="list-style-type: none"> <li>Implement Steering Committees for key systems to prioritize expense efforts. (<i>Established for Customer Services, Transmission, and Business Enterprise Systems</i>)</li> <li>Continue to work with business units to develop business cases for both capital and expense projects.</li> </ul>
	Almost Certain	Moderate (\$1-10M)	
GBS2	Failure to implement controls which enable support teams to support development, test, and production with current available resources.		<ul style="list-style-type: none"> <li>Implement change management processes under the IVC project in the FY2014-FY2015 timeframe</li> <li>Implement a maturity framework for software development – FY2015 timeframe for non-CBS systems</li> <li>Leverage automation and tools to reduce manual activities and increase productivity – FY2015 under ITSM project</li> </ul>
	Almost Certain	Minor (\$100K-1M)	
GBS8	Failure to coordinate between IT and business units to ensure resources are marshaled and positioned to meet business units' current and future needs.		<ul style="list-style-type: none"> <li>Implement Steering Committees for key systems to prioritize expense efforts.</li> <li>Continue to work with business units to develop business cases for both capital and expense projects.</li> <li>Combination of creating Asset Plans coupled with establishment of Asset Strategy has aided in mitigating this risk.</li> </ul>
	Possible	Moderate (\$1-10M)	
GBS9	Failure to position resources to address and meet emerging compliance requirements (e.g. A123, NERC CIP, eDiscovery, NIST standards, etc.).		<ul style="list-style-type: none"> <li>A123 process tracking has been added as a IT target for FY10</li> <li>A permanent position has been filled to support existing NERC/CIP system support for IT (ProWatch)</li> <li>Cyber Security (JB) has added staff to address NIST standards and testing for new systems.</li> </ul>
	Likely	Minor (\$100K-1M)	
GBS12	Failure to have a mechanism in place to align resources (staff, and support of service contracts) to securely and reliably maintain newly delivered systems		<ul style="list-style-type: none"> <li>Work with APSC to ensure adequate resources are in place to cover any new service contracts and labor costs as criteria for approving a new project.</li> <li>Investigate possibility of benefiting organization(s) transferring a portion of their saving to the maintenance organization to cover new expense from the delivery of new systems/applications</li> </ul>
	Likely	Moderate (\$1-10M)	
GBS13	Failure to maintain a stable work force to ensure reliable and secure maintenance of existing systems and to facilitate system development.		<ul style="list-style-type: none"> <li>Senior IT leaders will develop staffing strategy to address possible alternates to reduce contractor turnover in key positions.</li> <li>IT Workforce Plan was developed, implementation is pending resolution of HCM hiring issues</li> <li>Examine alternative contractor staffing vehicles</li> </ul>
	Likely	Moderate (\$1-10M)	
GBS15	Failure to have a Software as a Service (SaaS) strategy to control costs and risks associated with adoption of SaaS services to include an exit strategy.		<ul style="list-style-type: none"> <li>Develop cloud strategy to include covering the selection, implementation, use, and exit strategy for cloud services such as SaaS.</li> <li>Ensure decision to implement a cloud service includes a robust business case</li> <li>Ensure robust risk analysis performed on potential cloud services prior to adoption</li> </ul>
	Possible	Moderate (\$1-10M)	
GBS16	Lack of standards in how we manage data and data quality		<ul style="list-style-type: none"> <li>Define data quality measures by subject area</li> <li>Continue to develop plan for the implementation of a CIM with the business</li> <li>Update/define roles around data provider and data consumer. This will help in improving discussions around data quality and the SLA's needed to support it.</li> <li>Formalize the role of data stewards/data stewardship (i.e. accountability)</li> </ul>
	Almost Certain	Moderate (\$1-10M)	

**Table 6.3: BPA Commercial and Enterprise Portfolio Risks**



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**FY 2014 BPA IT Asset Strategy Plan**

ID	Risk		Mitigation
	Likelihood	Impact	
CBS3	Failure to anticipate changes in business (e.g. Wind Integration, Sub Hourly, Dynamic Transfer, Regional Dialog, TPIP, Smart Grid, etc.) and to have resources marshaled to enable these process changes.		<ul style="list-style-type: none"> <li>• Work with Risk Management and the business lines to anticipate market and industry changes as far ahead of time as possible.</li> <li>• Information Owner Boards and Steering Committee (see Table 6.2) are helping to mitigate this risk</li> <li>• Portfolio Managers working with Information Owners are helping to mitigate this risk</li> <li>• Capturing planned future activities, both capital and enhancement, in Application Asset Plan is proving to be a useful tool to mitigate this risk; although, Asset Planning still needs to mature to completely mitigate this risk.</li> </ul>
	Possible	Moderate (\$1-10M)	
CBS4	Failure to have adequate access to business analysts and subject matter experts to address the expanding scope of requests from business units.		<ul style="list-style-type: none"> <li>• IT workforce strategy specifies the need to create and maintain a layer of permanent federal workers filling the roles of business analyst and system analyst; however, implementation of this strategy may be delayed due to priority placement of previously disadvantaged applicants.</li> </ul>
	Likely	Moderate (\$1-10M)	
CBS6	Failure to have adequate resources to support dispersed geographic locations.		<ul style="list-style-type: none"> <li>• To the extent possible use remote technologies such as monitoring, server control, and change detection/configuration management to mitigate the lack of on-site staff at ADC; however, currently there is not enough onsite staff to operate ADC for an extended occupation.</li> </ul>
	Possible	Minor (\$100K-1M)	
CBS7	Failure of Commercial Off The Shelf (COTS) and Software as a Service (SaaS) solutions to provide responsive service, adequate quality control, and continuous service		<ul style="list-style-type: none"> <li>• Use contract hold-backs as incentives for vendor to perform to BPA's satisfaction.</li> <li>• Review contracts before each renewal for possible renegotiation of the service level based on past performance of the vendor and future BPA needs. Review COTS/SaaS providers <ul style="list-style-type: none"> <li>• Bandwidth for providing enhancements and improvements</li> <li>• Quality Assurance practices</li> </ul> </li> <li>• Meet with vendor technical staff regularly to provide feedback on their performance.</li> </ul>
	Possible	Minor (\$100K-1M)	
CBS9	Failure of infrastructure initiatives to achieve cost benefits, resulting in not realizing operational savings that are planned to be reprogrammed to support application enhancements.		<ul style="list-style-type: none"> <li>• Implement demand management practices to prioritize limited enhancement resources.</li> <li>• Note: Although this risk is minor using the Agency's impact scale, this risk if realized will have a significant impact on this asset category.</li> </ul>
	Possible	Moderate (\$1-10M)	

**Table 6.4: Critical Business Systems Portfolio Risks**



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**FY 2014 BPA IT Asset Strategy Plan****6.4 Strategies**

<b>Portfolio Strategy</b>	<b>Benefits</b>	<b>Challenges/Issues</b>	<b>Outlook</b>
Asset Plans: Develop individual system asset plans covering maintenance, enhancements, eventual replacement.	<ul style="list-style-type: none"> <li>• Builds partnership between IT and business units</li> <li>• Identifies out year support costs</li> <li>• Establishes performance and value metrics</li> <li>• Identifies risks</li> <li>• Tracks life cycle and helps set replacement/retirement targets</li> <li>• Individual plans will contribute to the Application Portfolio which will contribute to IT Asset Strategy.</li> </ul>	<ul style="list-style-type: none"> <li>• Business units and IT are not accustomed to developing and using metrics</li> <li>• Most business units are not accustomed to thinking more than a year ahead on their system needs</li> <li>• It will take time and resources to develop asset plans covering the major IT systems</li> </ul>	<ul style="list-style-type: none"> <li>• Efforts are underway to begin developing asset plans for the top five Critical Business Systems and top five BPA Commercial Enterprise systems</li> <li>• Development of system level asset plans is already in the System Development Life Cycle, systems being delivered in FY2014 will need to provide the maintenance team with the initial asset plan</li> <li>• Steering committees have been established for several key systems, i.e., FMS and HRmis, which can be leveraged for managing asset plans</li> </ul>
System Architecture: Develop plans to leverage existing system capabilities, for improving interoperability and for implementing Service Oriented Architecture.	<ul style="list-style-type: none"> <li>• New systems will be implemented to leverage and reuse existing capabilities instead of delivering similar/redundant capabilities, which drives up BPA's IT Costs</li> <li>• Reduces time to deliver new systems</li> <li>• Improves interoperability and reduces data integrity issues</li> </ul>	<ul style="list-style-type: none"> <li>• Project managers and project sponsor are accustomed to thinking in terms of best of breed and business unit needs &amp; benefits versus BPA needs and benefits</li> <li>• Project managers and sponsors often view considering BPA needs as unwelcomed scope creep with a negative impact on their project's budget and timeline</li> <li>• Has proven difficult to reserve resources for establishing business analyst and system analyst positions, as well as staff with both skills and aptitude to fill positions</li> </ul>	<ul style="list-style-type: none"> <li>• The project management is maturing to ensure BPA needs are considered and included into project where feasible and appropriate.</li> <li>• The IT department has not developed mature system architecture nor a comprehensive approach to implementing a Service Oriented Architecture. Availability of resources is slowing progress; outlook is for continued constrained resources and slow progress through FY2014.</li> </ul>

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**FY 2014 BPA IT Asset Strategy Plan**

<b>Portfolio Strategy</b>	<b>Benefits</b>	<b>Challenges/Issues</b>	<b>Outlook</b>
Application Performance Monitoring: Move to proactive monitoring of quality of service.	<ul style="list-style-type: none"> <li>Combines incident and problem management to identify most problematic alerts.</li> <li>Identifies problems and implements corrective actions (where possible) to avoid service disruption</li> <li>Aligns with industry best practices</li> </ul>	<ul style="list-style-type: none"> <li>Establishing response thresholds and developing corrective action scripts is labor intensive - requires a commitment of resource to receive benefit.</li> <li>Organizational boundaries coupled with roles and responsibilities have impeded deployment of application monitoring in the past</li> <li>Project managers have not been including application monitoring capabilities as a system requirement</li> <li>Need to develop consensus on application monitoring capabilities</li> </ul>	<ul style="list-style-type: none"> <li>Limited application monitoring was implemented in FY2011, resources constraints may delay maturity until FY2014</li> <li>Including requirement for application monitoring in SLC ensures new systems will be delivered with this capability.</li> <li>CBS has made improvements in monitoring systems; however, still need to make improvements in end user experience monitoring.</li> </ul>
System Development Life Cycle(SDLC): (Rebranded System Life Cycle, SLC)	<ul style="list-style-type: none"> <li>Use System Life Cycle as a change agent to ensure new development follows industry best practices.</li> <li>Incorporate Least Total Cost of Ownership</li> </ul>	<ul style="list-style-type: none"> <li>Maturing the use of the SLC through the maintenance cycle will require both training and change management. Maintenance currently is accustomed to simply making business requested changes with minimal adherence to SLC.</li> </ul>	<ul style="list-style-type: none"> <li>System work products called out by the SLC are being created by projects. Through training coupled with change management these work products will be maintained to improve and control the evolution of systems to meet emerging business requirements and to identify when systems should be upgraded or replaced.</li> </ul>
Software Maturity Model: Adopt a maturity model to improve quality and predictability of software development and maintenance activities.	<ul style="list-style-type: none"> <li>Provides guidance for developing or improving processes that meet the business goals</li> <li>Provides guidance for quality processes, and provides a point of reference for appraising current processes</li> <li>Provides essential elements for effective and continuous process improvement</li> </ul>	<ul style="list-style-type: none"> <li>Currently there is large diversity in the approaches project and maintenances teams use in developing and maintaining systems. Change management will be needed to select and adopt a common model.</li> <li>High rate and number of new projects beginning in FY2010 to date has made it difficult to devote resources to identifying and implementing a software development maturity model.</li> </ul>	<ul style="list-style-type: none"> <li>CBS will begin an effort in FY2014 to first identify a software maturity model and then plan the piloting and adoption of the maturity model. This effort is viewed as a critical endeavor to improve the agency development capabilities and will take several years from conception to reach the higher levels of a maturity model.</li> </ul>

**Table 6.5: Application Portfolio Strategies**

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**FY 2014 BPA IT Asset Strategy Plan****6.5 Asset Portfolio Outcomes**

<b>Application Objectives</b>	<b>Strategy</b>	<b>Asset Portfolio Measures</b>
Enable secure and reliable automation of business processes and functions.	<ul style="list-style-type: none"> <li>• Leverage System Life Cycle</li> <li>• Application Performance Monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Health and status monitoring will be implemented for all systems by FY2013 - completed for CBS</li> <li>• Performance and quality of service monitoring will be implemented for top 50% of critical business systems and top 10% of BPA commercial enterprise systems by FY2014. – 80% completed for CBS</li> </ul>
Evolve and leverage systems capabilities to meeting emerging business objectives.	<ul style="list-style-type: none"> <li>• System Architecture</li> <li>• Leverage System Life Cycle</li> </ul>	<ul style="list-style-type: none"> <li>• Develop Service Oriented Architecture (delayed from FY2010 &amp; FY2012 asset strategy) CST (Collaboration Standards Team) is working on developing and extending current architecture by EOY 2015.</li> <li>• Develop Agency Common Information Model (CIM) beginning with a model covering Transmission services by EOY2015.</li> </ul>
Provide guidance on tactical and strategic evolution of systems that balance business unit's requirements with BPA objectives.	<ul style="list-style-type: none"> <li>• Asset Plans</li> <li>• System Architecture</li> </ul>	<ul style="list-style-type: none"> <li>• Extend asset planning beyond top ten resource business systems and cover all CBS by EOY2015</li> <li>• Identify tool to aid in managing asset planning and integrate with, or provide, demand management capabilities.</li> </ul>
Services are delivered and asset components maintained in compliance with Federal laws and regulations.	<ul style="list-style-type: none"> <li>• Leverage System Life Cycle System</li> </ul>	<ul style="list-style-type: none"> <li>• System Security Plans will be reviewed and updated annually or upon major system enhancement.</li> </ul>
Processes and practices aligned with industry practices to deliver secure, reliable services with the least total cost of ownership.	<ul style="list-style-type: none"> <li>• Leverage System Life Cycle</li> <li>• Software Maturity Model</li> </ul>	<ul style="list-style-type: none"> <li>• Identify software maturity to govern development and maintenance by EOY2014.</li> </ul>

**Table 6.6: Applications Portfolio Outcomes****6.6 Future Initiatives**

New assets to the Application Portfolio are delivered through the PMO Work Plan; we have included the capital requirements for Application Portfolio in the PMO Work Plan.

The target expense profile in Table 6.6 represents our anticipated expense requirements when taking into account the combined upward pressure from adding new systems from the PMO Work Plan (approximately 5% of the initial investment) and the downward efficiency savings from adopting a development maturity model (significant efficiencies are not expected until FY2018 and beyond). The high expense requirements consider cases where we adopt more



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SaaS solutions than we currently anticipate, which would require expense instead of capital to implement. The low requirements factor in the cases where we are able to achieve accelerated efficiencies from adopting a software development maturity model, software rationalization (reducing number of systems with similar or overlapping capabilities), and more effectively leveraging the capabilities of our current systems to meet emerging business requirements.

There are a number of additional uncertainties that we are not able to quantify at this time. These include

- Compliance: Move to DOE/OMB compliant system(s) would have initial cost and unknown (at this time) ongoing costs – our current assumptions are that annual cost would be similar to hosted on premise. Possible systems impacted by these directives include parts to all of our Financial Management System and our Human Resource Management System.
- Decision to replace our ERP system in FY2019 instead of upgrade. Our target expense assumes an upgrade and not a replacement. Moving to DOE/OMB compliant systems(s) may supersede this issue.

	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023
<b>Major Initiatives</b>			BICC	BICC						
			Billing Upgrade	Billing Upgrade				Billing Upgrade		
	HCM Remediation	HCM Remediation	HCM Remediation	Upgrade Financials				Upgrade Financials		
		Asset Suite Upgrade	Asset Suite Upgrade	Decision ERP upgrade or replace	Plan ERP upgrade or replace	ERP upgrade or replace	ERP upgrade or replace	Asset Suite Upgrade		
		Procurement Compliance Infrastructure	Procurement Compliance Infrastructure							
		CRM Upgrade	CRM upgrade				CRM Upgrade			
		Sunflower Upgrade					Sunflower Upgrade			
			Analytics	Analytics						
		IT Service Management	IT Service Management	IT Service Management				Upgrade IT Service Management		
	Structure Data Management	Structure Data Management	Structure Data Management							

**Table 6.6: Application Major Initiatives (Expansion – Green, Red- Compliance)**

	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023
<b>Target</b>	30,325	34,960	36,551	38,100	38,659	39,626	40,202	41,188	41,738	42,788
<b>High</b>	30,325	43,700	45,688	47,625	48,323	49,533	50,253	51,458	52,229	53,484
<b>Low</b>	30,325	31,464	32,896	34,290	34,793	35,663	36,182	37,069	37,605	38,509

**Table 6.7: Application Portfolio Expense Requirements (\$K)**



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**FY 2014 BPA IT Asset Strategy Plan****7.0 IT Project Management Office (PMO) Work Plan****7.1 Goals & Objectives**

The IT PMO Work Plan is a collection of capital and expense business technology investments and initiatives prioritized by the Agency Prioritization Steering Committee (APSC), approved by the CIO, and executed by the IT Project Management Office (PMO). The IT PMO Work Plan does not in and of itself have assets, rather assets delivered under this work plan will be delivered to either the Network, Data Center, Office Automation, or Application Portfolios.

<b>IT PMO Work Plan Objectives</b>	<b>Aligns with IT Asset Goals</b>	<b>End-Stage Targets</b>
Investments will balance the immediate needs of the business units with the overarching Agency strategic initiatives/objectives in the selection and delivery of solutions.	ITAG 3 – P <sup>32</sup> ITAG 2 – S	<ul style="list-style-type: none"> <li>Selected investments represent diverse investments that span and enable achievement of BPA's strategic initiatives.</li> <li>Following the SLC, capital and expense projects are sourced from asset plans and forwarded to the IT PMO for APSC consolidation and consideration.</li> <li>Investment selection and prioritization aligns with Agency's Asset Management Capitalization process.</li> <li>Develop and/or buy COTS solutions that leverage and, where possible, contribute to Service Oriented Architecture and data abstraction.</li> <li>Projects utilize and contribute to a library of Enterprise reusable components and services to reduce development time, development costs, and maintenance costs.</li> </ul>
Deliver maintainable and cost effective solutions for APSC prioritized investments.	ITAG 2 – P ITAG 3 – S	<ul style="list-style-type: none"> <li>Ability to fund future maintenance costs of a project is a decision criterion in prioritizing and approving an investment. (No project is allowed to deliver a solution that has not validated the ability to support operations and maintenance).</li> <li>Solution selections adhere to BPAM Chapters 660 and 661.</li> <li>A solution with projected annual operations and maintenance costs greater than 15% of investment costs is required to receive IT Asset Manager and CIO exception.</li> </ul>
Processes and practices aligned with industry practices to deliver secure, reliable services and quality products with the least total cost of ownership.	ITAG 4– P ITAG 2 – S	<ul style="list-style-type: none"> <li>Projects deliver systems following the System Lifecycle (SLC), to include delivering system security plans, and adhering to FISMA controls (NIST SP 800- 53R3)</li> <li>Portfolio, Program, Project Management Maturity Model (P3M3) level 3 achieved. This includes, but is not limited to benefit management and realization (documenting business benefits, and performing post investment review of benefits)</li> <li>Selection of solutions follows BPAM chapters 660 and 661 guidance.</li> </ul>

**Table 7.1: IT PMO Work Plan Objectives**

In the past two years, the PMO has been investing resources and attention in improving processes and reducing risks associated with the IT PMO Work Plan following the Portfolio, Program, and Project Management Maturity Model (P3M3). As a result of this alignment, the IT PMO Work Plan Objectives have been updated, with 2 of the 5 previously identified

<sup>32</sup> Each objective relates to a single primary goal indicated by "P"; objectives may also relate to secondary goal, indicated by "S".



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objectives removed and 3 updated to align with the P3M3 framework. The objectives have been dropped from Table 7.1, IT PMO Work Plan Objectives, but have been included in Appendix for reference.

**7.2 Current State**

The major aspects of the IT PMO Work Plan can be summarized as:

- Capital Work Plan continues to complete a high number of projects to support critical Agency business objectives. Some of the major new systems delivered since FY2012 include: Slice, Energy Efficiency Interim Solution 2.0 (EE IS 2.0), RODS Replacement, Loads Obligation and Resource Analyzer (LORA), Budget Planning, Forecasting, Analysis System (BPFAS), Customer Billing Center Phases 2 and 3, Customer Contracts Management Phase 2, Customer Data Management Phase 2, Customer Portal Phase 2, Data Center Modernization (for critical business systems and required to support Regional Dialogue systems), and Wireless Workplace.
- 56<sup>33</sup> projects are in inception, alternatives analysis, system planning, execution, not started or on hold, representing a proposed IT PMO portfolio allocation. Some of the significant Agency technology investments include: FERC Order 890 15 minute scheduling, NERC ATC MOD standards compliance (Powerflow Information Storage & Balancing tool project), Real time hydro modeling and load monitoring tools including Columbia Vista Short-Term Replacement and Real Time Load Monitoring projects, Energy Efficiency Central Replacement, Cyber Security Operations and Analysis Center (CSOAC).
- We have been recently executing on a capital program of approximately \$40M annually. With major infrastructure sustain projects coming to completion, we are projecting a reduction in capital spending in the out-years.
- The expense portions of a project (inception, alternatives analysis, contract development and negotiation, and business process developments) range from 7% to 15% of a project's capital investment (we spend 7 to 15 cents in expense for every capital dollar we expend).
- Business investments deliver efficiencies to the Agency, not IT, while IT absorbs and manages the new expense operations and maintenance costs from delivering new systems (as a general rule of thumb, every dollar spent on a business investment results in about a nickel in net new IT operations and maintenance costs). As discussed in the Overview chapter, these business investments put pressure on the operations and expense budgets.
- In order to mature our analysis of business benefits and business cases in general, we now require that business owners and information system owners develop a set of measurements to capture actual versus projected benefits from deployment of new systems. Results are reported back to the APSC.

The current status of the IT PMO Work Plan is discussed in detail below:

The IT Project Management Office (PMO) at SOY2013 adopted the Portfolio, Program, Project Management Maturity Model (P3M3) as a framework to continuously improve the IT

<sup>33</sup> IT PMO Work Plan dated 11/4/13

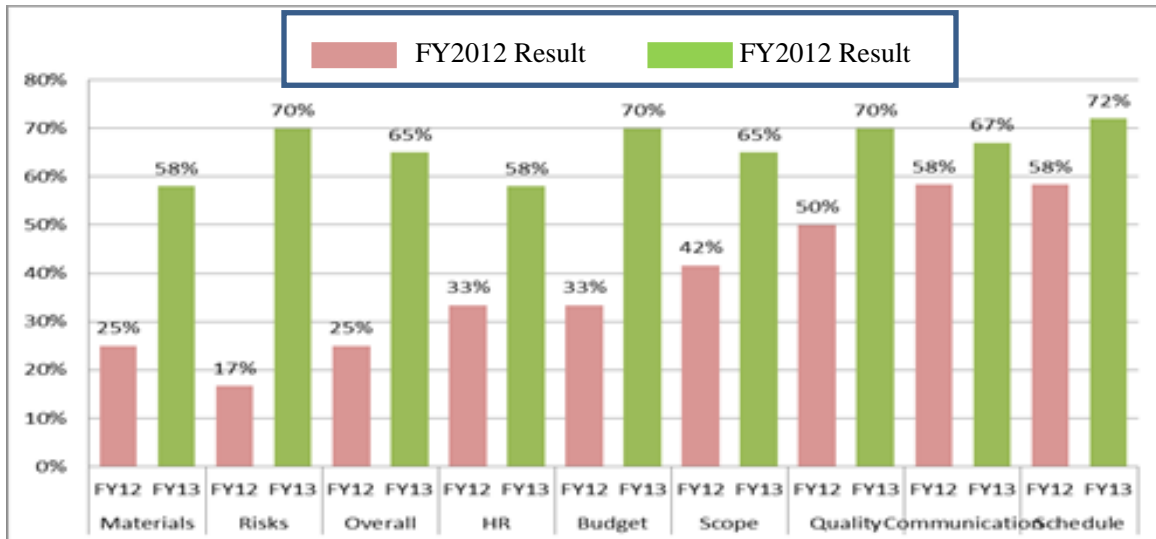




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PMO. In surveying 40% of active projects, with over 50+ internal clients, we saw improvements in all areas from our FY12 baseline metrics (see chart below).



**Figure 7.1: FY2012 versus FY2013 Client Satisfaction Results**

The following summarizes the people, process and technology improvements the IT PMO has achieved in the past 2 years.

**People Improvements**

- Increased project human resource (HR) client satisfaction results from 33% in FY12 to 58% in FY13.
- Leveraged new managed services and staffing contracts to reduce project resource turnover and increase our ability to execute on approved targets.
- Resourced small expense (small-p) efforts with level 1 PMs.

**Process Improvements**

- Refined annual portfolio prioritization and approval process with focus on the business case. All FY14 project requests completed a business case within 8 weeks.
- Implemented the health watch program to ensure troubled/underperforming projects deliver against their approved scope, schedule and budget targets. 8 projects were identified throughout FY13. 2 projects were terminated.
- Matured business case review process to begin cancelling projects that fail to demonstrate a positive return on investment (one project was cancelled FY2013).
- Released SLC 3.0 with significant updates to the Requirements Management Capability including transitioning focus from document management to content management.
- Integrated our strategic planning with the Agency Asset Management for the new Agency capital nominations process.

**Technology Improvements**

- Transitioned from documenting requirements in a word file to managing in an automated system. Implemented Jama Contour for Requirements Management. Over 60% of the








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projects leveraged Contour. We now have visibility and traceability from goals, objectives down to requirements and use cases. We have the ability to reuse requirements and we have introduced collaboration and metrics around the review and approval process.

The PMO maintains, and reports monthly on, key project performance metrics on all projects in the Capital Work Plan. These performance metrics can be accessed from the PMO website at [PMO Monthly Summary](#). Executive/Lead Sponsors, with the assistance of Project Managers, are required to present to the Agency Prioritization Steering Committee a justification for spending or time schedules that exceed planned levels by more than 10%. The Capital Work Plan, including authorized spending levels, is also maintained on the PMO web site at [PMO Work Plan](#).

IT PMO Work Plan Objectives	Status Meeting Objectives	Comments
Investments will balance the immediate needs of the business units with the overarching Agency strategic objectives in the selection and delivery of solutions.		<ul style="list-style-type: none"> <li>Solutions are chosen to meet specific business needs and in concert with the Agency strategic objectives. Focus and emphasis on the business case will ensure the right IT portfolio is prioritized and delivery of project is reasonable. The IT PMO will continue to develop the process for business transformation planning to improve the formality and consistency of asset planning, investment selections, and project execution.</li> <li>Selection of investments is maturing to include review of business benefits and measuring business benefits.</li> </ul>
Deliver maintainable and cost effective solutions for APSC prioritized investments.		<ul style="list-style-type: none"> <li>APSC is now reviewing estimates of solutions' maintenance costs as project moves into execution phase and again prior to project transition to close out.</li> </ul>
Processes and practices aligned with industry practices to deliver secure, reliable services and quality products with the least total cost of ownership.		<ul style="list-style-type: none"> <li>We have a maturing PMO and governance process that does align with industry practices. We are taking additional steps to improve and strengthen those processes and practices to assure the most effective TCO that can be achieved.</li> <li>Adopt Project Management Maturity Model (P3M3)</li> </ul>

**Table 7.2: Status Capital Work Plan in Meeting Objectives****7.3 Risks**

The PMO continues to invest resources and attention in improving processes and reducing risks associated with the IT PMO Work Plan. As a result of these efforts, and through adopting the P3M3 maturity model, the PMO has dropped the risk from the FY2012 IT Asset Strategy dealing with maturing project management<sup>34</sup>. However, a new risk has been added concerning the maturity of software development.

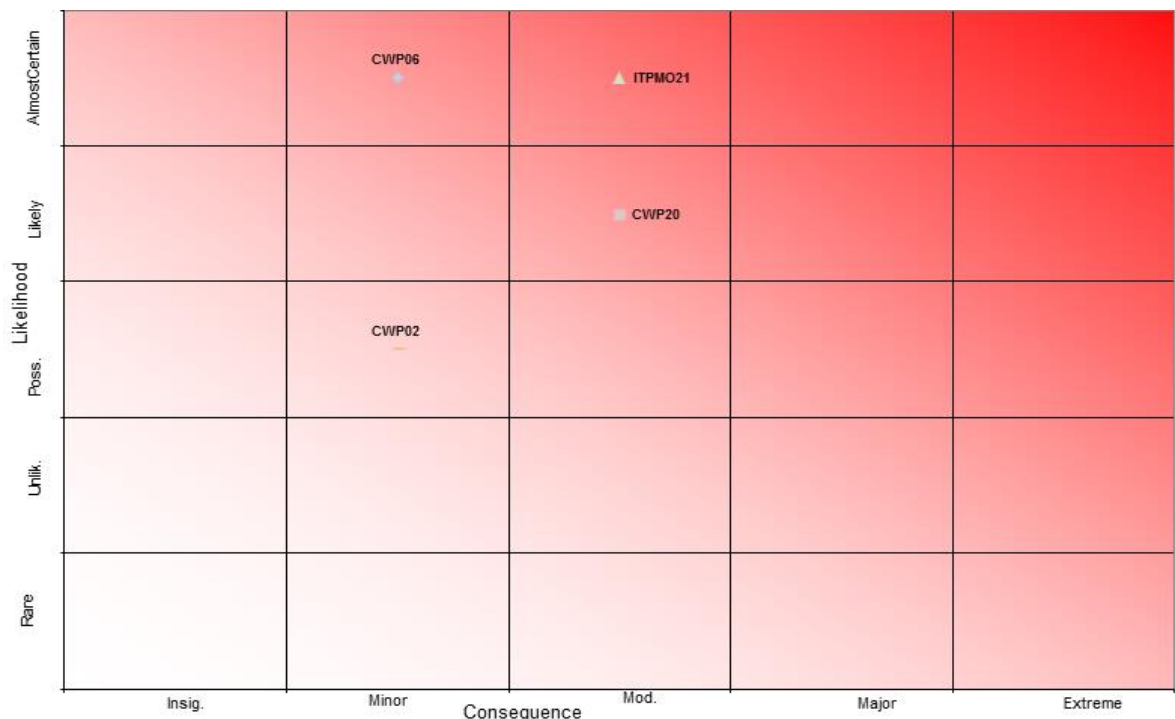
<sup>34</sup> CWP12: Failure to evolve the PMO.



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ID	Risk		Mitigation
	Likelihood	Impact	
CWP02	Failure to assure well defined business process to drive project requirements.		Perform a project quality check for all project requests. This would include an assessment on business readiness at each phase gate or project change request. Incorporate business process targets in project planning and monthly status reporting to ensure accountability of the business sponsors and SME, provide visibility to all stakeholders, and incorporate controls for performance deficiencies.
	Possible	Minor (\$100K - \$1M)	
CWP06	Failure to assure increased O&M expense budget for post-delivered project systems.		Provide a formal mechanism for O&M recipients to properly reflect budget changes needed to support newly delivered projects. This should include any work necessary to decommission existing applications/systems being replaced by the new delivery.
	Almost Certain	Minor (\$100K - \$1M)	
CPW20	Failure to provide a consistent integration plan for standalone and grouped (program level) projects.		A standard Integration Plan will be modeled that can be used by all projects and multi-project programs. It will be developed to provide a baseline onto which individual requirements can be added. This model will be vetted with the Chief Technical Officer, IT managers, and select business representatives for appropriateness and completeness.
	Likely	Moderate (\$1M - \$10M)	
ITPMO21	Failure of software development to mature at a comparable level as the PMO hinders IT's ability to effectively execute on new capabilities, and deliver on mission critical investments, while balancing the demands of operating and maintaining production systems.		Partner with software development on a maturity model (e.g. CMMI, ITIL) to measure progress. Another mitigation is to separate development and production management.
	Almost Certain	Moderate (\$1M - \$10M)	

**Table 7.3: IT PMO Work Plan Risks****Figure 7.2: Capital Work Plan Risk Map**

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**FY 2014 BPA IT Asset Strategy Plan****7.4 Strategies**

The IT PMO overarching strategy is centered on adopting the Portfolio, Program, and Project Management Maturity Model (P3M3) maturity framework covering project management. Table 7.4 describes our current state and the future state we are targeting for each capability in terms of the P3M3 model. The table also includes the benefits from achieving the target maturity level.

Capability	Current State		Future State	
	Estimated Maturity	Description	Targeted Maturity	Benefits / Attributes
<b>Portfolio Management</b>	< Level 1 – Awareness of process	<p><b>Strengths:</b> The IT PMO has developed initial portfolios with alignment to strategic business objectives for 4 portfolios – Transmission, Power, Corporate and IT.</p> <p><b>Weaknesses:</b> There lacks formal governance, training, development, clear expectations, metrics, defined communication structure, investment and benefits decision making and management model</p>	<b>Level 3 – Defined Process</b>	<ul style="list-style-type: none"> <li>• Informed decision making with alignment to strategic objectives with clear priorities.</li> <li>• Accurate forecasting for determining meaningful and validated investments.</li> <li>• Optimized allocation of resources. Includes focused training intended to raise competence of individuals in specific roles and centrally managed role definitions and sets of competencies defined and used to support appointments.</li> <li>• Portfolio Management Office reports to Executive Board.</li> </ul>
<b>Program Management</b>	< Level 1 – Awareness of process	<p><b>Strengths:</b> There have been successes with programs (e.g. REV, TCSR, RODS).</p> <p><b>Weaknesses:</b> Effectiveness is associated with the program manager. There lacks definition on when a project should be a program or when a program should be a project. The criteria, metrics, communications, terminology and definitions, reporting structure (within the PMO and with the business) are unclear and/or undefined.</p>	<b>Level 3 – Defined Process</b>	<ul style="list-style-type: none"> <li>• Coordinated and integrated projects that can deliver an outcome greater than the sum of its parts.</li> <li>• Defined program visions and blueprints.</li> <li>• Defined program goals and objectives with traceability down to individual project key performance indicators (KPIs).</li> <li>• Program lifecycle exists, with clearly defined critical points (gates) and is applied consistently.</li> <li>• Regular and consistent reporting across all program structures.</li> </ul>
<b>Project Management</b>	Level 2 – Repeatable process	<p><b>Strengths:</b> Projects are delivered against their approved baselines.</p> <p><b>Weaknesses:</b> Lack consistent and predictability. Disconnect and/or low customer satisfaction with the Operations &amp; Maintenance (O&amp;M) organizations. Quality of work products is unknown (i.e. baseline and metrics are non-existent).</p>	<b>Level 4 – Managed Process</b>	<ul style="list-style-type: none"> <li>• Consistent, predictable, and transparent project delivery.</li> <li>• High customer satisfaction, employee morale, and quality work products.</li> <li>• Risk management focused on costs, quality and timescales for delivery.</li> <li>• Effective management controls to evaluate quality and assess project health.</li> </ul>
Capability	Current State		Future State	
	Estimated Maturity	Description	Targeted Maturity	Benefits / Attributes
<b>Requirements Management</b>	< Level 1 – Awareness of process	<p><b>Strengths:</b> The IT PMO has established and is the owner of the Requirements Management (RM) Capability in the SLC. A Senior Business Analyst BFTE position has been prioritized and will be onboarded in FY13 Q1. A business analysis plan template, initial RM roadmap, and trainings have been developed.</p> <p><b>Weaknesses:</b> There lacks formal governance, training, development, clear expectations, metrics, and defined communication structure. Upfront business goals and objectives, traceability to requirements and test cases, and overall estimation for level of efforts are inconsistent.</p>	<b>Level 3 – Defined Process</b>	<ul style="list-style-type: none"> <li>• Scope and requirements management is centralized and automated.</li> <li>• Reporting on scope is in real time.</li> <li>• Impact of requirement changes to scope is visible.</li> <li>• Upfront project analysis (metrics, process definition, transformation planning) is completed prior to IT project initiation – leading to <u>successful</u>* delivery of projects and business solutions.</li> <li>• Reduction in re-work.</li> <li>• Improved PMO client satisfaction (58% to 70%).</li> </ul>

**Table 7.4: Capital Work Plan Strategies**

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The IT PMO Work Plan has developed the following strategies to achieve the objectives outlined:

## 1. Portfolio and Project Management

- Implement the project, program, portfolio management system (P3MS), replacing the 9 in-house cuff systems with 1 COTS system.
- Incorporate a more robust project risk management model in the SLC with costs directly associated with likelihood, impact, and severity.
- Decrease turnover and better align skillsets with project staffing needs.

## 2. Requirements Management (RM)

- Extend Contour across all projects.
- Incorporate the business transformation planning (BTP) process into project inception.
- Perform project/business readiness assessments for all projects going through the APSC phase gates.

## 3. Quality Assurance (QA) and Organizational Change Management (OCM)

- Standardize and improve project QA and OCM deliverables and resourcing strategy.

**Outlook:** The first year of adopting the P3M3 framework has already resulted in measurable improvements as can be seen from Figure 7.1. The PMO will work on transitioning to each of the capabilities' targeted maturity levels.

**7.5 Capital Work Plan Outcomes**

<b>Capital Work Plan Objectives</b>	<b>Strategy</b>	<b>Asset Portfolio Measures</b>
Investments will balance the immediate needs of the business units with the overarching Agency strategic objectives in the selection and delivery of solutions.	<ul style="list-style-type: none"> <li>• Align Work Plan with Agency's strategic initiatives and Risks</li> <li>• Strengthen architecture review to ensure alignment with BITA, extend Service Oriented Architectures and make maximum reuse of current capabilities</li> </ul>	<ul style="list-style-type: none"> <li>• IT Asset Manager will produce and maintain a mapping of Capital Work Plan projects and Agency Strategic Initiatives/Objectives/Risks. Mapping will allow visualization of how portfolio is meeting Agency needs</li> <li>• Systems design must receive architecture review and sign off by CTO</li> </ul>
Deliver maintainable and cost effective solutions for APSC prioritized projects.	<ul style="list-style-type: none"> <li>• Mature SLC Asset Domain</li> <li>• APSC oversight to include maintenance costs</li> <li>• Mature Asset Plans</li> </ul>	<ul style="list-style-type: none"> <li>• All completed capital projects will undergo reviews to ensure delivery of:               <ul style="list-style-type: none"> <li>○ Solutions that adhere to BPAM Chapter 660 and Chapter 661 guidance</li> <li>○ Updated business cases in the SLC post implementation phase</li> <li>○ IT asset plan accepted by IT Asset Manager and Information Solution Owner</li> </ul> </li> <li>• All projects over \$1M must produce and have acceptance by the IT Asset Manager a metric plan that measure business value and performance before moving into the execution phase</li> </ul>



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<b>Capital Work Plan Objectives</b>	<b>Strategy</b>	<b>Asset Portfolio Measures</b>
Processes and practices aligned with industry practices to deliver secure, reliable services with the least total cost of ownership.	<ul style="list-style-type: none"> <li>• Adopt P3M3 maturity framework</li> </ul>	<ul style="list-style-type: none"> <li>• Move PMO capabilities from current state to future state (see Table 7.4)</li> <li>• Measure key performance indicators (see Figure 7.1): materials, risks, overall performance, HR, budget, scope, communication, and schedule.</li> </ul>
Services are delivered and asset components maintained in compliance with Federal laws and regulations.	<ul style="list-style-type: none"> <li>• Adhere to FISMA controls</li> <li>• Adhere to NERC-CIP where applicable</li> </ul>	<ul style="list-style-type: none"> <li>• Controls documented in System Security Plans with systems having an authorized/approved System Security Plan and Authority To Operate from the Approving Officer.</li> </ul>

**Table 7.5: Capital Work Plan Outcomes****7.6 Future Initiatives**

We are working to strengthen our identification of out-year investments. To date we have been working in a 1-3 year window for our business. We are actively working to widen the planning horizon to seven years, which is very challenging for information technology solutions. The drivers behind widening our planning horizon include enabling us to better:

- Align investments with Agency initiatives,
- Identify and validate business value/benefits for each investment,
- Plan for any necessary business organization change,
- Identify connections and dependencies between investments,
- Marshal and plan resources to implement solutions, and
- Forecast our budget requirements.

We have just begun taking our first steps in looking at a broader planning window. We are aligning our efforts with the Agency's Capital Planning and Asset Strategy initiatives. In particular, we are using and maturing each of our Asset Categories' Asset Plans to estimate out-year investment requirements. To be successful in this approach, we must partner and become strategic partners with the various business units throughout the Agency. We are leveraging our PMO Portfolio Managers, our operations managers, and our IT Asset Manager to engage with our business partners to help them articulate their future business needs and to capture them in the Asset Plans. We are forming joint strategy teams with our internal business partners to covers areas from Enterprise Systems to data quality to business intelligence.

Table 7.6 represents our current seven-year projection of major<sup>35</sup> investments based on cost, business impact, risk mitigation, or compliance. Tables 7.7 and 7.8 are our accompanying estimates for the capital and expense requirements to execute our Work Plan. We need to point out that the further out in time we go, the more uncertainty there is in the timing of future

<sup>35</sup> Table 7.6 is not exhaustive of all our know projects and only meant to illustrate the breadth of the PMO Work Plan for our major projects.



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investments. Examples of these timing issues include which year to launch and complete the replacement of our billing system – the current solution will go out of vendor support in FY2018. However, is the risk low enough to delay and complete in FY2019? In a similar vein, we will need to determine the start and completion dates around our financial and human capital systems. There is also a possibility that we will be urged or directed to adopt a federal solution for these systems.

There is also a great deal of uncertainty around costs of an investment, especially until we have time to understand business needs and requirements, have gone through analysis of alternatives, and selected a solution. As we go through these phases, we are able to reduce the uncertainties around the investment in terms of both timing and budget.

To account for the uncertainties in these tables, we have provided targets for funding, along with a high and low requirement to account for the uncertainties associated with our targets. For the most part, we expect the total funding will be neutral in terms of the combined capital and expense requirements with the uncertainty causing shifts in the timing of executing the spend or shifts between capital and expense. Drivers of shift between capital and expense may be due to the need for expense instead of capital to implement a cloud-based solution. In this camp, solutions for Vegetation Management and Fleet Management (projects in flight) have the possibility of adopting SaaS as the optimal solution. If both occur, we would see a drop of \$1.9M in capital in FY2015 with an offsetting rise in expense.

Another example of where we encounter uncertainty is in projects like Business System Disaster Recovery. Although we are beginning planning on this FY2016 project, there are a range of possible solutions that have significant difference in both the cost and type of funds needed to execute. These alternatives range from using IaaS (this would be an expense funding requirement) to host our disaster recovery capabilities, to moving the Integrated Test Environment (ITE) from the headquarters datacenter to Munro Scheduling Center (MSC). In this case, the ITE would become our production center if the headquarters datacenter became unavailable during an event. Or we may elect building and reproducing our production environment at the MSC.

Additional uncertainties that can impact our projections include:

- Emerging compliance requirements
- Unexpected and rapid storage growth
- Changes in hardware pricing (shift from capital to expense due to IT capitalization rules)
- Mitigation requirements for emerging security threats





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	<b>FY2014</b>	<b>FY2015</b>	<b>FY2016</b>	<b>FY2017</b>	<b>FY2018</b>	<b>FY2019</b>	<b>FY2020</b>	<b>FY2021</b>
<b>Major Initiatives</b>	IVC	IVC	DMZ Refresh					Refresh Upgrade IDS
	NCC	NCC	Business System Disaster Recovery	Business System Disaster Recovery	Business System Disaster Recovery	Business System Data Center Refresh		Refresh Field WAN Devices
	DDR	DMZ Refresh						
	Managed Print Services	Managed Print Services	Move to IPv6	Move to IPv6	CBS Datacenter Refresh			Refresh Upgrade Firewalls
	DMP							
	ICAM	ICAM	ICAM	ICAM	ICAM			
	CSOAC	POWER Constraint Mngmnt System	POWER Constraint Mngmnt System	Structured Data Mngmnt	Structured Data Mngmnt			
	FERC Order 764							
	TAS Lines	TAS Lines	TAS Lines	TAS Lines	Implement ERP Solutions	Imp. ERP Solutions	Imp ERP Solutions	
	AMS-AOC	AMS-AOC	AMS-AOC	TSC				
	UDM	UDM	UDM	UDM	IT Service Mngmnt			
	PISB	PISB	IT Service Mngmnt	IT Service Mngmnt				
	EECR	EECR						
	Streamflow	Streamflow	TAPM	TAPM				
	TSC	TCS	TCM		Billing Information system Upgrade			
	HCM	HCM	HCM	HCM				
	TAS CEP	Billing Information system Upgrade	Billing Information system Upgrade	Billing Information system Upgrade				
	RTLM		Smart Grid Demand Response	Smart Grid Demand Response				

**Table 7.6: Work Plan Major Initiatives (Green Expansion, Blue Sustain, Red Compliance)**

	<b>FY2014</b>	<b>FY2015</b>	<b>FY2016</b>	<b>FY2017</b>	<b>FY2018</b>	<b>FY2019</b>	<b>FY2020</b>	<b>FY2021</b>
Target	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
High		11.0	9.0	10.5	11.0	11.0	8.5	9.5
Low		8.5	7.0	7.5	7.0	6.5	5.5	5.5

**Table 7.7: Work Plan Expense Requirements (\$M)**

	<b>FY2014</b>	<b>FY2015</b>	<b>FY2016</b>	<b>FY2017</b>	<b>FY2018</b>	<b>FY2019</b>	<b>FY2020</b>	<b>FY2021</b>
Infra structure		6.5	1.3	0.4	10.0	5.0	2.5	2.0
Business Investments	30.0	22.0	20.0	24.0	33.4	27.0	24.5	36.6
Target (Business + Infrastructure)	43.0	28.5	30.3	32.4	42.0	27.0	24.5	24.0
High	43.0	28.5	37.3	39.4	42.0	27.0	24.5	24.0
Low	43.0	28.5	30.3	32.4	42.0	27.0	24.5	24.0

**Table 7.8: Work Plan Capital Requirements (\$M)**



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**FY 2014 BPA IT Asset Strategy Plan****Appendix A: IT Key Performance Indicators**

To support our Asset Plans, and the management of our assets, we are maturing a set of metrics that will inform us of the state of our assets as well of their level of performance, both in terms of meeting customers' needs and economic targets. A major component of our metric plan includes our participation in UNITE. UNITE is a consortium of twenty utilities from across the nation engaged in benchmarking the performance of IT operations and practices with the intent of aiding members in understanding their performance against their peers and to identify areas that can be improved.

We completed our initial benchmarking cycle with UNITE early 2012 and are utilizing 2011 data. We intend to leverage our benchmarking work with UNITE to formalize our metric collection program and in doing so incorporate key UNITE metrics and methodologies. We will use this past cycle to establish 2011 as a baseline for several key metrics. This adoption of UNITE metrics and methodology is reflected in changes we are making in our IT Asset Strategy Performance Indicators. This is the ideal time to make these changes as we are in the initial stage of implementing these metrics. We are on the heels of another benchmarking year with UNITE, at the close of FY2013 we will start to collect and report metrics to UNITE. We expect to see results from the consortium members for 2013 by the end of the 3<sup>rd</sup> Quarter FY2014.

**Summary of IT Performance Indicators (ITPI)**

This is IT's second reporting period after establishing baselines for our indicators. Although the status of each indicator is informative, the true value for NJ comes in the analysis of the trend of these indicators over time. The trend will allow us to determine how our strategies toward our assets is or is not meeting our objectives and will provide us insight in to where we need to concentrate our resources or rethink our strategy.

Below is a summary of performance indicators, future reports will begin to incorporate trend analysis. These performance indicators show that in the second reporting period our strategies to contain operations and maintenance cost below inflation (and new contract cost from moving new systems into production) are working. We do have some voice network components - private branch exchanges (PBX) and the voicemail system - that are beyond their end of life which is driving ITPI-5 to red for this reporting period. The voicemail system will be replaced in the second quarter for FY2014 by leveraging Exchange 2010 (we are currently in the middle of upgrading to Exchange 2010). The PBXs are scheduled to be replaced as part of the network modernization in FY2014-FY2015. This indicator will remain red until the PBXs are refreshed or replaced. Software utilization collection was suspended during the roll-out of the MyPC, in light of not having the appropriate tools to collect and report on this measure, this measure will continue to report red until MyPC is fully deployed. Server operating and system configuration monitoring slipped to red due to project delay in implementation of IVC.

Details on why/how each indicator received its status are in the tables in the Performance Indicators section.



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Indicator		FY2012 Status	FY2013 Status
ITPI-1	Average Personal Computing Device Cost	GREEN	GREEN
ITPI-2	Software Utilization	GREEN	RED
ITPI-3	Enterprise Printing Costs	GREEN	GREEN
ITPI-4	Network Utilization	GREEN	GREEN
ITPI-5	Network & Voice Operations and Maintenance Status	RED	RED
ITPI-6	Physical Windows Server Consolidation	GREEN	GREEN
ITPI-7	Data Center Maintenance Operations and Maintenance Growth	GREEN	RED
ITPI-8	Server Operating System Configuration Monitoring	GREEN	RED
ITPI-9	Ability to Enhance Systems	GREEN	GREEN
ITPI-10	Operations and Maintenance Growth	GREEN	GREEN

**Performance Indicators****Office Automation:**

Average Personal Computing Device Cost (ITPI-1)	
<b>Measure:</b>	Average Cost of supporting a personal computing device at BPA.
<b>Background:</b>	BPA is implementing a number of initiatives that will impact the cost of maintaining a personal computing device (e.g. desktop, laptop, etc.). These initiatives include moving from a target for personal computing devices of 80% laptop to 20% laptops; introducing virtual desktop infrastructure (application streaming, thin clients, etc.); leveraging automation for the deployment and maintenance of personal computing devices; and adopting Microsoft Operations Framework (MOF) to improve support processes and efficiencies. The objective is to drive the average costs of a personal computing device below the FY2010 average plus inflation; however, refreshing BPA's personal computing fleet in FY2011 through FY2012 may see a rise in the average cost before a drop is realized.
<b>Methodology:</b>	Review and validate BPA's cost calculation against industry standards. Adjust values and methodology to conform to industry best practices in capturing this metric. Establish baseline using existing data. Collect and report on average personal computing device cost quarterly.
<b>Targets:</b>	
FY2011	Establish metric collection methodology by Q4 FY2011. Establish baseline for FY2010 costs by Q4 FY2011. Collect and begin reporting Average Personal Computing Costs by Q4 FY2011.
FY2012-FY2017	Green – Average cost is at or below FY2010 baseline Yellow – Average cost is between FY2010 baseline and baseline plus inflation Red – Average cost is above FY2010 baseline plus inflation.
<b>Status: GREEN</b>	In FY2011 BPA joined UNITE, a consortium of 20 utilities engaged in benchmarking. NJ has decided to align its benchmark for the average cost of a computing device with UNITE methodology and to leverage our work with UNITE. This has resulted in using FY2011 as our baseline instead of FY2010. <b>FY2011 Baseline: \$3,750/device (\$1,875 hardware, \$950 software, \$975 labor)</b> <b>FY2012: \$2950/device – an \$800/device reduction from the FY2011 baseline.</b> <b>FY2013: \$2885/device – a \$65/device reduction from FY2012.</b>
<b>Owner:</b>	Loyd Towe



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**FY 2014 BPA IT Asset Strategy Plan**

<b>Software Utilization (ITPI-2)</b>	
<b>Measure:</b>	Software license compliance and recovery of eligible licenses.
<b>Background:</b>	Desktop software license tracking has been an imprecise manual task which in the past has resulted in substantial license true-up costs to purchase new licenses. We have not been able to determine if we can redeploy under-utilized client licenses to avoid new license costs. Automating the tracking and usage of software license would ensure BPA is fully compliant with software licensing and could reduce software costs by recovering and redeploying under-utilized software.
<b>Methodology:</b>	Identify and deploy automated tools to enable the tracking of software license compliance and usage. Establish list of high value software titles for usage tracking and set usage thresholds for software recovery (removing from desktop). Report quarterly on license compliance and license recovery and redeployment.
<b>Targets:</b>	
FY2011 – FY2012	Identify and implement tools to track software licenses and usage. Identify key software titles for usage tracking. Establish thresholds for license recovery by title. Establish baseline for software recovery (number of eligible licenses recovered).
FY2012-FY2017	Green – 100% license compliance and recovery of >85% eligible software licenses Yellow – >95%, <100% license compliance and recovery of >65%, <85% eligible licenses Red - <95% license compliance and <65% recovery of eligible licenses
<b>Status: RED</b>	<p>As part of the desktop modernization project, we have identified 20 desktop COTS application used by the majority of the Agency. After this set of 20 applications, the number of users per applications drops quickly to about 100 users or fewer per software title. The majority of our deployed desktop titles have less than 20 people using a given title.</p> <p>We have identified 8 titles for FY2012 that we have set usage thresholds and begun reclamation of these titles. We will expand to begin tracking and revering all 20 titles in FY2013 using System Center and Apps Portal, a software metering application. .</p> <p><b>FY2012: Thresholds set for 8 titles, \$149K savings from reclaiming and re-issuing titles</b></p> <p><b>FY2013:</b></p> <p><b>During FY13 manual software reclamation efforts were stopped while the staff focused on supporting the Desktop Modernization Project (DMP)/MyPC and the deployment of new systems. This effort will be resumed after completion of DMP and the implementation of new software tracking tools</b></p>
<b>Owner:</b>	Loyd Towe

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**FY 2014 BPA IT Asset Strategy Plan**

<b>Enterprise Printing Costs (ITPI-3)</b>	
<b>Measure:</b>	Printer utilization operation and maintenance costs.
<b>Background:</b>	Printers tend to be older at BPA than industry averages. After three years of service, the cost of toner and other consumable supplies for a given model rapidly escalate and begin driving the cost of ownership up. After five years of service, the costs of consumables tilt the total cost of ownership to favor unit replacement. BPA needs to control cost by replacing aging, although functioning, printers. Tracking the TCO of printers and their age will help BPA move towards industry standards and control the total cost of printers. [N.B. in FY2010 BPA spent over \$800K on toner and printer consumables excluding paper, in FY2012 BPA spent \$1.2M in toner.]
<b>Methodology:</b>	Track total annual cost of printing (excluding plotters) and the cost of supporting individual models of printers to include replacement cost, consumables (excluding paper), and labor.
<b>Targets:</b>	
EOY2011	Establish FY2010 printer operation and maintenance actuals as the baseline for the annual cost for printing, establishing a baseline for field printing and non-field printing. Establish strategy for maintaining printers (e.g. annual refresh versus forklift replacement)
EOY2012	Implement printer maintenance strategy
EOY2013 – EOY2017	Green – Annual Printing cost is below EOY2010 baseline Yellow – Annual Printing costs are higher EOY2010 baseline and less than or equal to EOY2010 baseline plus inflation Red - Annual Printing cost is above EOY2010 baseline plus inflation
<b>Status: GREEN</b>	<p><b>FY2011 Baseline for Printers: \$2,812/printer</b>  <b>EOY2012:</b> \$2,812.45  <b>EOY2013:</b> \$2,733.00</p> <p><b>EOY 2013: Strategy/plan of action to control and reduce printer costs has been developed and put in place.</b></p> <p>FY2013 to date (8/23/13) Asset count in desktop steward organization = 1,105 with a value of \$688,942 (\$623.47 ea)  Labor cost FY to date for work order 270027 &lt;IT Printer &amp; Copier Support&gt; = \$95,803  Supply/consumable cost FY13 to date = \$667,876  Total expenditure (acquisition, labor, consumables) on currently active fleet = \$1,452,621 divided by asset count (1,105) = \$1,315 per unit</p> <p>Copier Lease (Pacific Office Automation) including consumables: count of 223 units at \$24,401.46 per month/ \$292,817.52 per year (\$1,313 per year each)  Xerox MFP (WC7535) lease (LSI inc.) including consumables: count of 14 units averaging \$6500 per month/\$78,000 per year (\$5,571 per year each)</p> <p>Adding the owned and leased devices gets a total of 1342. Total asset acquisition and annual lease costs each are \$8437.36.</p> <p>\$8,199/3 (average of owned, POA lease and LSI Lease)= <b>\$2733</b> each.</p>
<b>Owner:</b>	Tim Steed

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**FY 2014 BPA IT Asset Strategy Plan****Network & Voice**

<b>Network Utilization (ITPI-4)</b>	
<b>Measure:</b>	Utilization of network circuits and links.
<b>Background:</b>	BPA maintains server key circuits and links that are important to the communication, operation, and data transfer that enable BPA to perform its business functions securely and reliably. The utilization of these circuits should strike a balance between being over subscribed, which result in degradation of services, and under scribed, which represents inefficient use of resources and budgetary waste. [N.B. Circuit bandwidth must be sufficient to meet known and expected peak loads. These peaks must be factored in utilization metrics.]
<b>Methodology:</b>	Baseline utilization will be established in FY2011. Utilization thresholds will be set to bracket the range between effective usage of the circuit (ensuring circuit is not under-utilized nor oversubscribed). Exceeding the upper-end utilization may cause negative performance impacts on user and systems.
<b>Targets: FY2012-FY2017</b>	Average Utilization :Average of all circuits ( Sum (inbound and outbound Aggregated (5 minutes utilization averages) across the month)) <5% Yellow : Circuit usage and costs needs to be reviewed 5% -60% : Green : Normal >60% Yellow : Busy >80% Red : Congested
<b>Status: GREEN</b>	<b>FY2013:</b> Utilization of DMZ circuits are at .6% utilization, in the under 5% yellow category. The datacenter circuits are at 3.1% and the WAN is at 9% both within the green utilization band.
<b>Owner:</b>	Jerry Thompson, acting NJNN Manager

<b>Network &amp; Voice Operations and Maintenance Status (ITPI-5)</b>	
<b>Measure:</b>	Length of time equipment has been in-service compared with industry recommended benchmarks for age related replacement of equipment.
<b>Background:</b>	BPA's telecommunications infrastructure has been extremely reliable, but several systems are 8 to 12 years old and no longer supported by the vendor. Although spare parts can sometimes be obtained from third party suppliers, such parts are usually reconditioned used equipment and will become increasingly difficult to locate in the future. If our HQ PBX or company-wide voicemail system fails, BPA will be unable to conduct business as usual until a replacement is obtained. In order to document the potential risk to BPA, we will compare the age of our installed telecommunications systems to industry standards for equipment life expectancies including EIA / TIA, GSA, and others.
<b>Methodology:</b>	Review industry standard recommendations for the expected life of telecommunications equipment. Document the standards and note any significant differences between industry sources. Identify major systems to be tracked, document the installation dates, and compare to industry standard lifespans.
<b>Targets:</b>	
FY2011	Establish metric based on industry benchmarks and best practices for maintaining telecommunication infrastructure. Identify and document key components that will be included in this metric.
FY2012 – FY2017	<b>Green</b> – Equipment is within industry standard guidelines for life span and does not require replacement. <b>Yellow</b> – Equipment is within one year of exceeding industry standard guidelines for life span and will require replacement within one year. <b>Red</b> – Equipment has exceeded industry standard guidelines for life span and requires immediate replacement.



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<b>Status:</b> <b>RED</b>	<p><b>FY2013:</b> Portland's Carrier Grade PBX is 5 years senior to Vancouver's and consists of some EOL sub components (Power Supplies, card cages, and backplanes). The VoIP system rollout, planned for HQ in FY2014-15, will refresh these components and turn this metric green.</p> <p>The Voicemail system is beyond EOL and will be replaced with Exchange 2010 in MSC VOIP Project.</p> <p>Network Client Connectivity project is in-flight and will refresh WAN network components and prepare field sites for VoIP and IPv6. [N.B. 56% of WAN devices are within 2 years of reaching the 7 year EOL age]</p> <p>Major core network (HQ &amp; Ross) refresh/upgrade is scheduled for FY2014-FY2016. This upgrade will fresh network components and implement IPv6 (OMB mandate) and increase datacenter bandwidth to 10Gbs.</p>
<b>Owner:</b>	Jerry Thompson & Jeff Gannaway

**Data Center**

<b>Physical Windows Server Consolidation (ITPI-6)</b>	
<b>Measure:</b>	Ratio of Windows Virtual Servers to Physical Servers
<b>Background:</b>	Historically projects at BPA have procured development, test, and production servers to host new systems. This practice has led to BPA supporting over 1100 servers, many of these servers running at less than 20% CPU utilization – far below industry recommendations – resulting in unnecessary high cost to support BPA's systems. With improved server hardware technology and the adoption of virtualization, the number of physical server can be substantially reduced, resulting in lower hardware costs, license costs, power consumption, and cooling cost. BPA is beginning the process of moving to virtual servers. This process will see a net increase in servers in FY2011 and possibly FY2012 as new servers hosts are put in place to allow the migration to virtual servers and retirement of existing servers.
<b>Methodology:</b>	Quarterly report on the ratio of virtual to physical windows production and test servers. Ratio will exclude physical domain controllers (2 physical servers for each domain) and field servers. [N.B. If decision is made to host non-critical business systems at an Alternative Data Center, the decision could delay achieving targets.]
<b>Targets:</b>	
EOY2011	Establish FY2010 baseline number of physical production and test servers, and baseline of virtual production and test servers.
EOY2012	<p>Green - Achieve overall ratio greater than or equal to .25 virtual servers to each physical server in test and production</p> <p>Yellow – Achieve overall ratio of virtual to physical servers greater than .19 and less than .25</p> <p>Red – Ratio of virtual servers to physical server is less than .19</p>
EOY2013	<p>Green - Achieve overall ratio greater than or equal to .7 virtual servers to each physical server in test and production</p> <p>Yellow – Achieve overall ratio of virtual to physical servers greater than .6 and less than .7</p> <p>Red – Ratio of virtual servers to physical server is less than .6</p>
EOY2014	<p>Green - Achieve overall ratio greater than or equal to 2 virtual servers to each physical server in test and production</p> <p>Yellow – Achieve overall ratio of virtual to physical servers greater than 1.5 and less than 2</p> <p>Red – Ratio of virtual servers to physical server is less than 1.5</p>
EOY2015- EOY17	<p>Green - Achieve overall ratio greater than or equal to 4 virtual servers to each physical server in test and production</p> <p>Yellow – Achieve overall ratio of virtual to physical servers greater than 3 and less than 4</p> <p>Red – Ratio of virtual servers to physical server is less than 3</p>





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<b>Status: GREEN</b>	<b>Q4 FY2013 Overall ratio is at 1.16 virtual servers to each physical server in test and production</b> NJ is on tract to meet FY2013 through the continued execution of the IVC project, which will continue to consolidated and virtualize non-critical business system servers.
<b>Owner:</b>	David Miller, NJND Manager

<b>Data Center Maintenance Operations and Maintenance Growth (ITPI-7)</b>	
<b>Measure:</b>	Data center operations and maintenance costs.
<b>Background:</b>	IT currently has several projects in flight designed to improve data center operations and reduce operating costs. These projects include introducing new hardware, automating routine process (e.g. provisioning servers), implementing management and monitoring tools, and implementing continuous process improvements through using an IT maturity model. These projects will be fully completed in the FY2012/FY2013 timeframe. [N.B. Software licenses historically grow faster than the rate of inflation and labor at the rate of inflation while automation will be adding new software licenses and reducing the amount of labor required for operation and maintenance. The assumption is labor saving, power savings, reduced hardware requirements will offset rising software licenses and labor rates.]
<b>Methodology:</b>	Quarterly track data center operations and maintenance costs through a combination of work orders and ABM codes. FY2011 will establish the data center operations and maintenance expense baseline. [N.B. Re-organizations of datacenter operations and application support during FY2010 renders FY2010 as unsuitable using this fiscal year or prior years for establishing a baseline.]
<b>Targets:</b>	
FY2011	Establish methodology baseline by Q4 2011
FY2012 – FY2017	Green – Operations and Maintenance costs equal or less than baseline Yellow – Operation and Maintenance costs are above baseline and below or equals baseline plus inflation Red – Operations and Maintenance cost are greater than baseline plus inflation
<b>Status: RED</b>	<b>FY2011 baseline is \$9.231M (NJCO \$1.158M, NJSO \$3.218M, NJND \$4.854M)</b> <b>FY2012:</b> \$9.476M (NJCO \$1.292, NJSO \$3.358M, NJND \$4,826M) <b>FY2013:</b> \$10.056M (NJCO \$1.282K, NJSO \$3.479M, NJND \$5.295M)  FY13-Operations and maintenance costs increased by \$580,562 from the FY2012 baseline and FY2013 operations and costs. The expected savings were not realized because of the delay of IVC. <i>*Actual with Forecast is based on actuals for Oct 12' thru Jul 13', plus Forecast for Aug 13' thru Sept 13'</i>
<b>Owner:</b>	David Miller, NJND Manager

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**FY 2014 BPA IT Asset Strategy Plan**

<b>Server Operating System Configuration Monitoring (ITPI-8)</b>	
<b>Measure:</b>	Percentage of test and production servers adhering to a certified baseline.
<b>Background:</b>	Server operating systems are required by FISMA to conform to a certified baseline. Until the advent of the Data Center Modernization Project, servers have been manually built resulting in few servers sharing a common operating system baseline let alone adhering to a common set of certified baselines. Through the implementation of automated tools and monitoring tools, new Windows 2008 servers can be delivered to into test and production using a certified baseline. In addition, changes to the baseline can be tracked and it can be determined if the changes are documented and authorized.
<b>Methodology:</b>	Use management software (for example, System Center Configuration Manager, VMware Vcenter, Tripwire, etc.) to validate server operating systems conform to a documented and certified baseline.
<b>Targets:</b>	
FY2011	Green – Deploy monitoring software to validate physical and virtual production and test server baselines conform to certified baselines. Provide weekly reports providing listing of Windows 2008 servers not conforming to a certified baseline. Yellow – Deploy monitoring software to validate physical and virtual production and test server baselines conform to certified baselines. Red – Partial implementation of monitoring software to validate physical and virtual servers conform to a certified base line
FY2012	Green – 100% of Windows 2008 production and test servers conform to a certified baseline Yellow – 99% of Windows 2008 production and test servers conform to a certified baseline Red – less than 99% of Windows 2008 production and test servers conform to a certified baseline
FY2013	Green – 100% of Windows 2008 and Linux production and test servers conform to a certified baseline Yellow – 99% of Windows 2008 and Linux production and test servers conform to a certified baseline Red – less than 99% of Windows 2008 and Linux production and test servers conform to a certified baseline
FY2014- FY2017	Green – 100% of Windows 200, Linux, and Solaris production and test servers conform to a certified baseline Yellow – 99% of Windows 2008, Linux, and Solaris production and test servers conform to a certified baseline Red – less than 99% of Windows 2008, Linux, Solaris production and test servers conform to a certified baseline
<b>Status: RED</b>	<b>FY2013:</b> The IVC project will move all non-critical legacy Windows servers to certified Windows 2008 baselines using automation to ensure deployed servers conform to baselines. Servers will be monitored by management and monitoring tools to ensure production servers adheres to certified baselines. <b>It is highly likely that this measure will fall to red due to the delay in the IVC project</b>
<b>Owner:</b>	David Miller, NJND Manager

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**FY 2014 BPA IT Asset Strategy Plan****Applications**

<b>Ability to Enhance Systems (ITPI-9)</b>	
<b>Measure:</b>	Ratio of estimated enhance backlog costs to enhancement budget
<b>Background:</b>	Enhancements are driven by planned or emerging business requirements and are discretionary in that they can be deferred without impacting a system/application's ability to function. As discretionary funding, the enhancement budget can be accessed to fund expense portion of projects and cover higher than anticipated operations and maintenance costs. IT is still in the process of working with business owners to develop and mature asset plans for the roughly 100 major systems and 400 web applications it maintains to support the Agency automation needs. As part of the maturing process, the asset plans are beginning to include estimates for the cost of planned enhancements. When enhancement funding is below the cost of planned enhancements, a backlog of enhancements emerges especially for lower priority systems. The net result includes business needs not being met in a timely manner, or not at all, and places more stress on already strained IT resources.
<b>Methodology:</b>	Use individual system asset plans to develop the cost for planned application enhancements spend profile by year. Track the ratio of actual enhancement costs to asset plans projected enhancement needs. A ratio of less than 1 will indicate a backlog is developing, resulting in business requirements not being met. A ratio of greater than 1 would indicate that either the enhancement resource projections were low or Asset Plans failed to anticipate high value emerging business enhancements. [N.B. This metric is an indicator on how well the Application Portfolio is (a) meeting its objective to "Evolve and leverage systems capabilities to meet emerging business capabilities", Table 6.2 IT Asset Strategy (b) addressing risk ACE1, Table 6.3 IT Asset Strategy (c) addressing risk CBS3, Table 6.4 IT Asset Strategy]
<b>Targets:</b>	
FY2011	Mature Application asset plans to develop estimates for projected enhancement budgets.
FY2012- FY2017	ratio of actual to asset plan projection is: Green - ratio greater than .9 and less than 1.1 Yellow – ratio is greater than .7 and less than .9 or greater than 1.1 and less than 1.3 Red – ratio is less than .7 or greater than 1.3
<b>Status: GREEN</b>	<p><b>FY2012:</b> \$3.32M Actual / \$3.61M Budgeted resulted in a ratio of .92</p> <p><b>FY2013:</b> \$5.999M Actual with Forecast* / \$6.498M Budget resulted in a ratio of .92</p> <p><b>Summary:</b> \$6.498 M was budgeted for systems enhancements in FY2012; actual with forecast is \$5.999M* for a ratio of .92. Although this is in the green range, it is at the low end of the green range, indicating we may have delayed some enhancements. It should be noted we used the SOY2013 budget numbers for system enhancements as the asset plans have not matured to the point of reliably using them to calculate this metric. We will be working on maturing asset plans in FY2014 to the point where they can be used to calculate this metric. NJO is taking the lead on collecting asset plans and assisting in maturing them.</p> <p><i>*Actual with Forecast is based on actuals for Oct 12' thru Jul 13', plus Forecast for Aug 13' thru Sept 13'</i></p>
<b>Owner:</b>	Jim Johnson, Acting NJO Manager

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<b>Operations and Maintenance Growth (ITPI-10)</b>	
<b>Measure:</b>	Application Operations and Maintenance costs.
<b>Background:</b>	Application operations and maintenance costs have been growing each year due to a combination of inflation and new systems placed into production. Projects are maturing to develop operations and maintenance costs for the new systems being delivered. These costs can be used to update new out year operation and maintenance costs.
<b>Methodology:</b>	Track applications operations & maintenance and enhancement costs (excludes PMO Projects) by department (NJC and NJS, excluding NJSO, NJCO and NJCM). FY2011 will establish the baseline for applications operations and maintenance costs.
<b>Targets:</b>	
FY2011	Use FY2011 to establish baseline for application operation and maintenance costs.
FY2012- FY2017	<p>Green – Operation and Maintenance Expenses are less than FY2011 baseline plus new systems costs</p> <p>Yellow - Operation and Maintenance Expenses are greater than FY2011 baseline plus new systems costs and less than less than FY2011 baseline plus new systems costs plus inflation</p> <p>Red - Operation and Maintenance Expenses are greater than FY2011 baseline plus new systems costs plus inflation</p> <p>Formula: (Applications O&amp;M costs &lt; baseline + new contracts +new labor)</p>
<b>Status: GREEN</b>	<p><b>FY2011: Application baseline \$22.110 (NJS \$17.715M, NJC \$4.394M)</b></p> <p>FY2012: Target: \$22.110M+\$3.367M=<b>\$25.477M</b></p> <p>FY2012: Contracts: <b>\$3.367M</b> (NJS \$2.765M, NJC \$602K)</p> <p><b>FY2012:</b> Application O&amp;M costs <b>\$22.932M</b> (NJS \$17.688M, NJC \$5.244M)</p> <p>FY2013: Target: \$25.477M + \$4.231M = \$29.708M</p> <p>FY2013: Contracts: <b>\$4.231M</b> (NJS \$1.615M, NJC \$2.616M) *</p> <p><b>FY2013:</b> Application O&amp;M costs <b>\$26.365M</b> (NJS \$19.607M, NJC \$6.758M) *</p> <p>Increase in O&amp;M for FY2013 is a result of FY2012 and FY2013 O&amp;M tail, plus the new O&amp;M associated with AVUE.</p> <p><i>*Actual with Forecast is based on actuals for Oct 12' thru Jul 13', plus Forecast for Aug 13' thru Sept 13'</i></p>
<b>Owner:</b>	Jim NJO Manager

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**FY 2014 BPA IT Asset Strategy Plan****Financial Disclosure**

This information has been made publicly available by BPA on February 18, 2014 and contains information not reported in BPA financial statements.

